FCC REPORT
(UNII)

Applicant: LigoWave LLC

Address of Applicant: 138 Mountain Brook Dr Canton, GA 30115 United States

Equipment Under Test (EUT)

Product Name: Broadband Digital Transmission System

Model No.: NFT 3ac

FCC ID: V2V-AC2800

Applicable standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407

Date of sample receipt: 13 Jun., 2016

Date of Test: 13 Jun., to 27 Dec., 2016

Date of report issued: 27 Dec., 2016

Test Result: PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	*27 Dec., 2016*	*Original*

Tested by: ***Date:*** *27 Dec., 2016*

Test Engineer

Reviewed by: ***Date:*** *27 Dec., 2016*

Project Engineer

3 Contents

Page

1 COVER PAGE 1
2 VERSION 2
3 CONTENTS 3
4 TEST SUMMARY 4
5 GENERAL INFORMATION 5
5.1 CLIENT INFORMATION 5
5.2 GENERAL DESCRIPTION OF E.U.T. 5
5.3 TEST ENVIRONMENT AND MODE 7
5.4 DESCRIPTION OF SUPPORT UNITS 7
5.5 LABORATORY FACILITY 7
5.6 LABORATORY LOCATION 8
5.7 MEASUREMENT UNCERTAINTY 8
5.8 TEST INSTRUMENTS LIST 8
6 TEST RESULTS AND MEASUREMENT DATA 9
6.1 ANTENNA REQUIREMENT 9
6.2 CONDUCTED EMISSION 10
6.3 CONDUCTED OUTPUT POWER 15
6.4 OCCUPY BANDWIDTH 36
6.5 POWER SPECTRAL DENSITY 53
6.6 BAND EDGE 74
6.7 SPURIOUS EMISSION 91
6.7.1 Restricted Band 91
6.7.2 Unwanted Emissions out of the Restricted Bands 100
6.8 FREQUENCY STABILITY 112
7 TEST SETUP PHOTO 114
8 EUT CONSTRUCTIONAL DETAILS 116

4 Test Summary

Test Item	Section in CFR 47
Antenna requirement	15.203/15.407 (g)
AC Power Line Conducted Emission	15.207
Conducted Peak Output Power	15.407 (a)
26dB Occupied Bandwidth	15.407 (a)
6dB Emission Bandwidth	15.407(e)
Power Spectral Density	15.407 (a)
Band Edge	15.407(b)
Spurious Emission	15.205/15.209
Frequency Stability	15.407(g)

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	LigoWave LLC
Address of Applicant:	138 Mountain Brook Dr Canton, GA 30115 United States
Manufacturer/Factory:	LigoWave LLC
Address of Manufacturer/Factory:	138 Mountain Brook Dr Canton, GA 30115 United States

5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	NFT 3ac
Operation Frequency:	Band 1: 5180MHz-5240MHz, Band 4: 5745MHz-5825MHz
Channel numbers:	Band 1: 802.11a/802.11n20: 4,802.11n40: 2,802.11ac:1 Band 4: 802.11a/802.11n20: 5,802.11n40: 2,802.11ac:1
Channel separation:	802.11a/802.11n20: 20MHz, 802.11n40: 40MHz, 802.11ac: 80MHz
Modulation technology: (IEEE 802.11a)	BPSK, QPSK, 16-QAM, 64-QAM
Modulation technology: (IEEE 802.11n)	BPSK, QPSK, 16-QAM, 64-QAM
Modulation technology: (IEEE 802.11ac)	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Data speed (IEEE 802.11a):	6Mbps, 9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps,MCS1:13Mbps,MCS2:19.5Mbps,MCS3:26Mbps, MCS4: 39Mbps,MCS5:52Mbps,MCS6:58.5Mbps,MCS7:65Mbps
Data speed (IEEE 802.11n40):	MCS0:15Mbps,MCS1:30Mbps,MCS2:45Mbps,MCS3:60Mbps, MCS4:90Mbps,MCS5:120Mbps,MCS6:135Mbps,MCS7:150Mbps
Data speed (IEEE 802.11ac):	Up to 866.7Mbps
Antenna Type:	PIFA antenna
Antenna gain:	3 dBi
AC adapter :	Adapter ① Model: GRT-POE20-480050A Input: AC100-240V 50/60Hz 0.5A Output: DC 48V, 500mA Adapter ② Model: G0720-480-050 Input: AC100-240V 50/60Hz 0.75A Output: DC 48V, 0.5A

Operation Frequency each of channel

Band 1					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	42	5210MHz
40	5200MHz	46	5230MHz		
44	5220MHz				
48	5240MHz				
Band 4					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	155	5775MHz
153	5765MHz	159	5795MHz		
157	5785MHz				
161	5805MHz				
165	5825MHz				

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Band 1					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest channel	5180MHz	Lowest channel	5190MHz	Middle channel	5210MHz
Middle channel	5200MHz	Highest channel	5230MHz		
Highest channel	5240MHz				
Band 4					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest channel	5745MHz	Lowest channel	5755MHz	Middle channel	5775MHz
Middle channel	5785MHz	Highest channel	5795MHz		
Highest channel	5825MHz				

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11a	6 Mbps
802.11n20	6.5 Mbps
802.11n40	13 Mbps
802.11ac	23.9 Mbps

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 6 Mbps for 802.11a, 6.5 Mbps for 802.11n20, 13 Mbps for 802.11n40 and 29.3Mbps for 802.11ac. All test items for 802.11a, 802.11ac and 802.11n were performed with duty cycle above 98%, meet the requirements of KDB789033.

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC
LigoWave	Passive Gigabit PSE	GRT-480050A	N/A	N/A

5.5 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

●FCC- Registration No.: 817957

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

●IC - Registration No.: 10106A-1

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

●CNAS - Registration No.: CNAS L6048

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366

5.7 Measurement Uncertainty

Items	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 30MHz)	2.14 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 dB (k=2)

5.8 Test Instruments list

Radiated Emission:

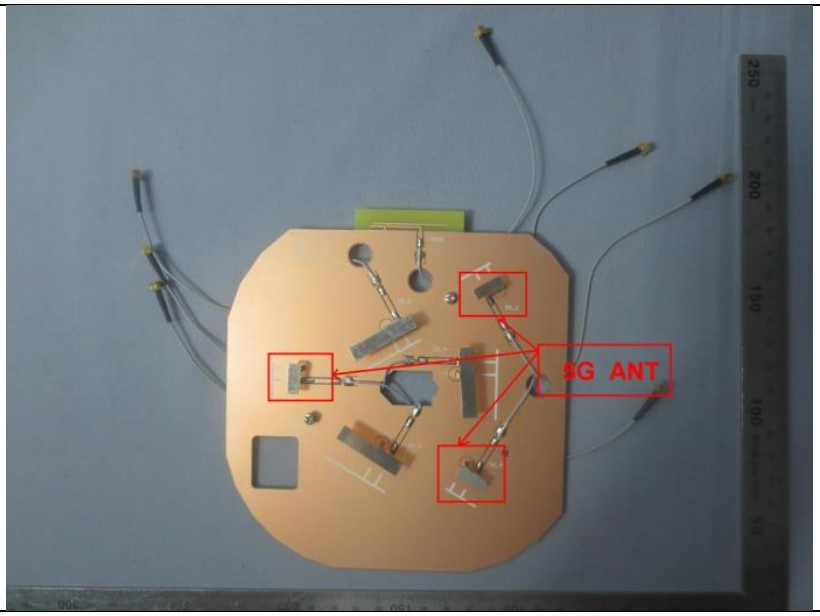
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-25-2016	03-25-2017
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-25-2016	03-25-2017
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2016	03-31-2017
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2016	03-31-2017
6	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2016	03-31-2017
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2016	03-31-2017
8	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-28-2016	03-28-2017
9	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-28-2016	03-28-2017
10	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2016	03-31-2017
11	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

Conducted Emission:

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	08-23-2014	08-22-2017
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-24-2016	03-24-2017
3	LISN	CHASE	MN2050D	CCIS0074	03-26-2016	03-26-2017
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2016	03-31-2017
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 E Section 15.203 /407(a)
15.203 requirement: *An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.* *This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213,§ 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.*	
E.U.T Antenna:	
The product is a professionally installed device which has PIFA antenna for the application. The best gain of antenna is 3 dBi.	
3T3R MIMO	
	

6.2 Conducted Emission

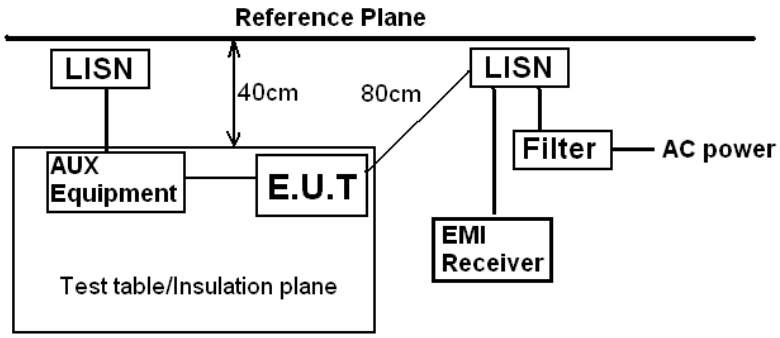
Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4: 2014
Test Frequency Range:	150kHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9kHz, VBW=30kHz
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	
0.15-0.5	66 to 56*	0.15-0.5
0.5-5	56	0.5-5
5-30	60	5-30
* Decreases with the logarithm of the frequency.		

Test procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

Test setup:



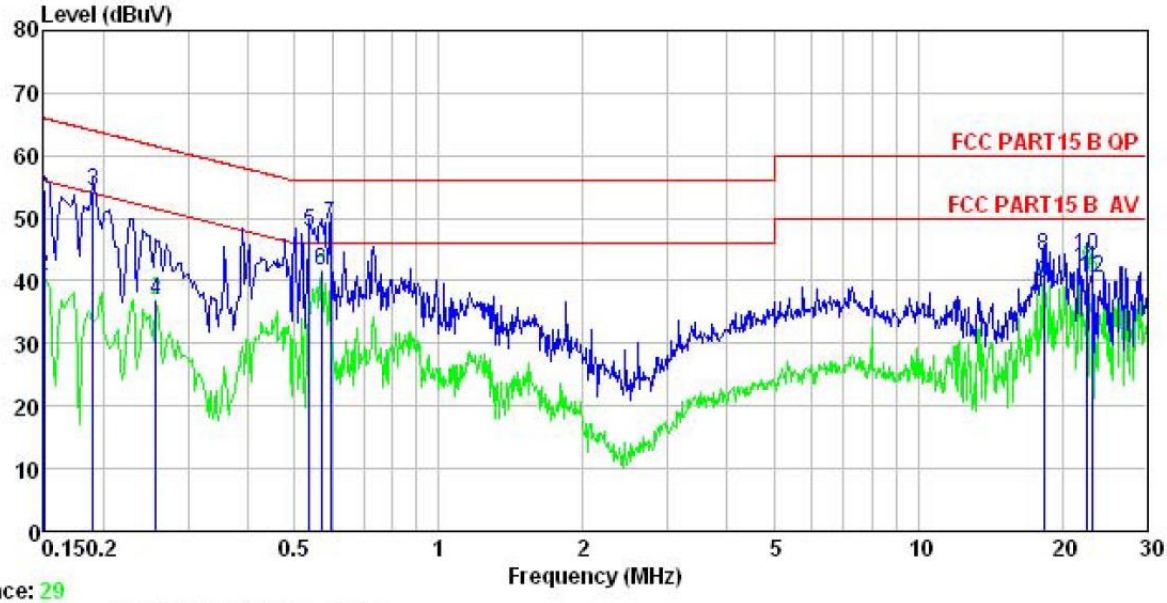
Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data:

Adapter① test mode

Neutral:




```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN NEUTRAL
EUT           : Broadband Digital Transmission System
Model         : NFT 3ac
Test Mode     : TX mode
Power Rating  : AC 120/60Hz
Environment   : Temp: 23 ℃ Huni:56%  Atmos:101KPa
Test Engineer: MT
Remark        : 5G WiFi(POE:GRT-POE20-480050A)
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	43.79	0.12	10.78	54.69	66.00	-11.31	QP
2	0.150	29.92	0.12	10.78	40.82	56.00	-15.18	Average
3	0.190	43.36	0.14	10.76	54.26	64.02	-9.76	QP
4	0.258	26.00	0.17	10.75	36.92	51.51	-14.59	Average
5	0.538	36.74	0.26	10.76	47.76	56.00	-8.24	QP
6	0.570	30.58	0.27	10.77	41.62	46.00	-4.38	Average
7	0.595	37.80	0.29	10.77	48.86	56.00	-7.14	QP
8	18.328	32.68	0.27	10.91	43.86	60.00	-16.14	QP
9	18.328	28.37	0.27	10.91	39.55	50.00	-10.45	Average
10	22.535	32.98	0.25	10.89	44.12	60.00	-15.88	QP
11	22.535	30.70	0.25	10.89	41.84	50.00	-8.16	Average
12	23.140	29.41	0.25	10.89	40.55	50.00	-9.45	Average

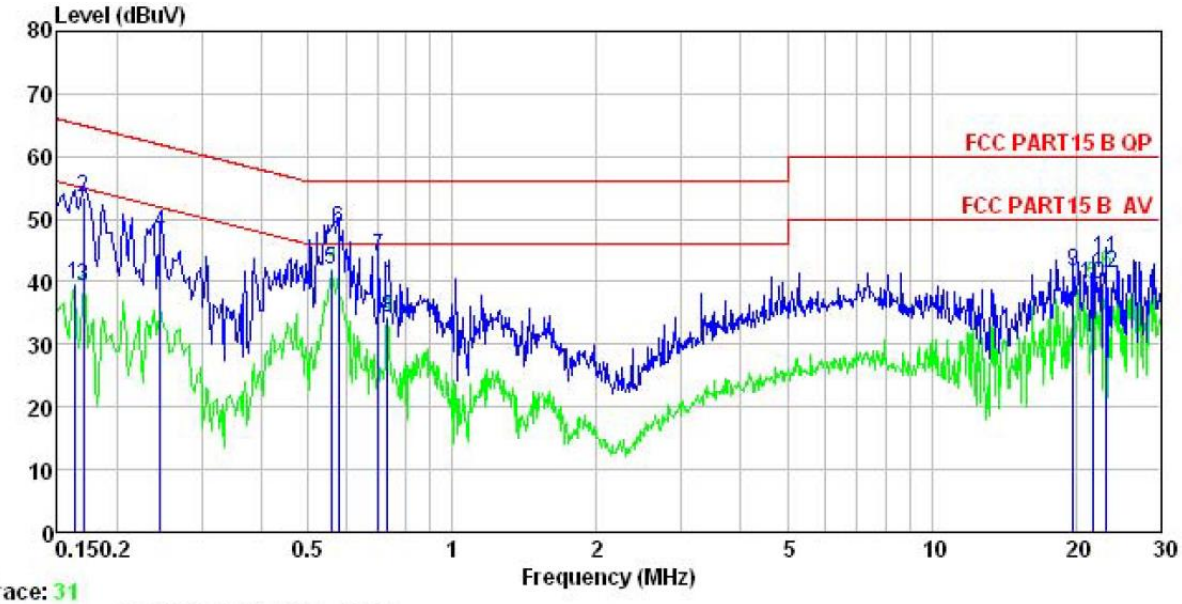
Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Line:



Trace: 31

Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN LINE
EUT : Broadband Digital Transmission System
Model : NFT 3ac
Test Mode : TX mode
Power Rating : AC 120/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: MT
Remark : 5G WiFi(POE:GRT-POE20-480050A)

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	28.71	0.14	10.77	39.62	55.34	-15.72	Average
2	0.170	42.62	0.14	10.77	53.53	64.94	-11.41	QP
3	0.170	28.31	0.14	10.77	39.22	54.94	-15.72	Average
4	0.246	36.81	0.16	10.75	47.72	61.91	-14.19	QP
5	0.558	30.97	0.27	10.77	42.01	46.00	-3.99	Average
6	0.579	37.26	0.27	10.77	48.30	56.00	-7.70	QP
7	0.701	33.04	0.32	10.77	44.13	56.00	-11.87	QP
8	0.731	23.24	0.31	10.78	34.33	46.00	-11.67	Average
9	19.740	30.27	0.33	10.93	41.53	60.00	-18.47	QP
10	21.715	28.38	0.35	10.91	39.64	50.00	-10.36	Average
11	23.140	32.32	0.35	10.89	43.56	60.00	-16.44	QP
12	23.140	29.99	0.35	10.89	41.23	50.00	-8.77	Average

Notes:

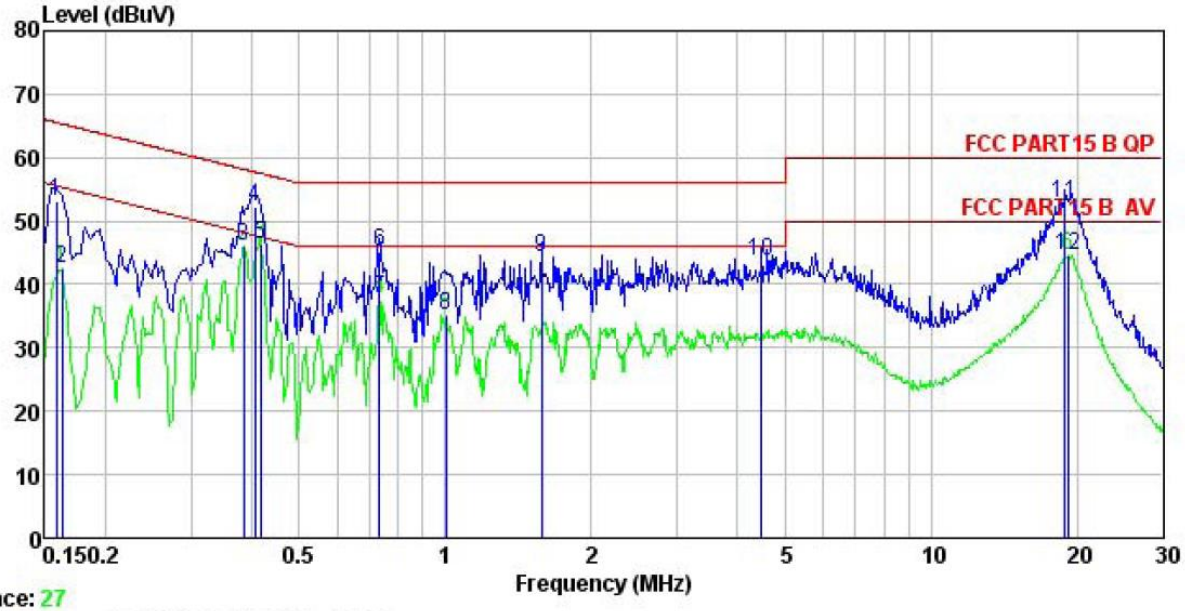
1. An initial pre-scan was performed on the live and neutral lines with peak detector.

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Adapter② test mode

Neutral:



Trace: 27

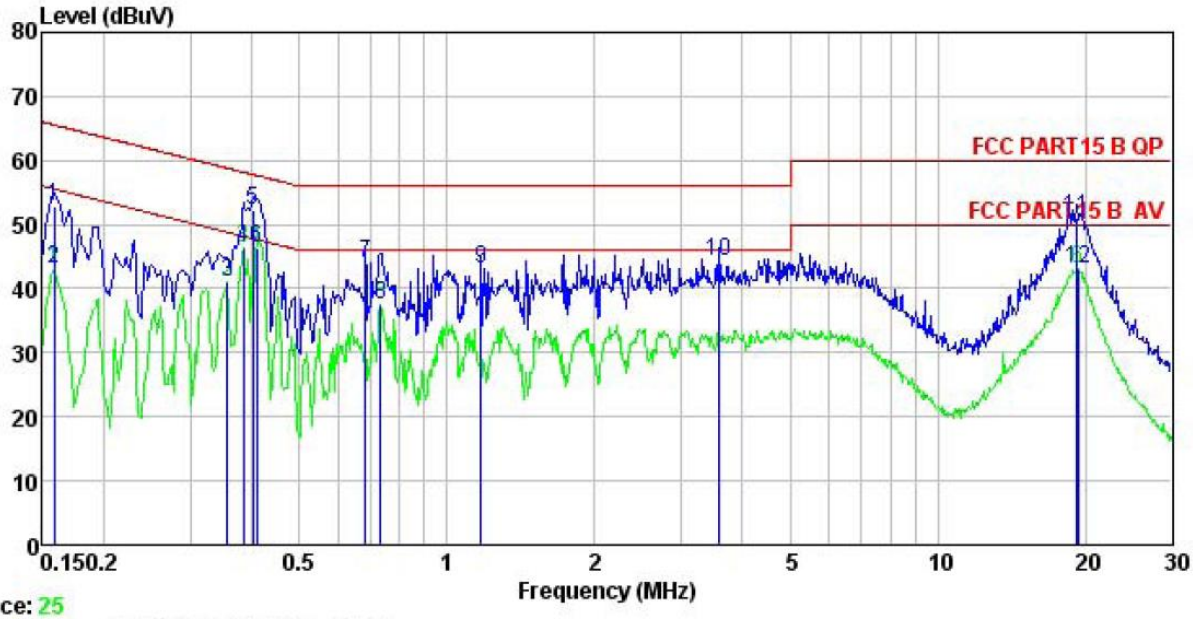
Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN NEUTRAL
EUT : Broadband Digital Transmission System
Model : NFT 3ac
Test Mode : TX mode
Power Rating : AC 120/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: MT
Remark : 5G WiFi(POE:G0720-480-050)

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	42.28	0.13	10.78	53.19	65.56	-12.37	QP
2	0.162	31.64	0.13	10.77	42.54	55.34	-12.80	Average
3	0.385	35.25	0.22	10.72	46.19	48.17	-1.98	Average
4	0.406	41.16	0.23	10.72	52.11	57.73	-5.62	QP
5	0.417	35.47	0.23	10.73	46.43	47.51	-1.08	Average
6	0.731	34.01	0.32	10.78	45.11	56.00	-10.89	QP
7	0.731	26.70	0.32	10.78	37.80	46.00	-8.20	Average
8	1.005	24.13	0.26	10.87	35.26	46.00	-10.74	Average
9	1.577	33.14	0.26	10.93	44.33	56.00	-11.67	QP
10	4.478	32.57	0.34	10.87	43.78	56.00	-12.22	QP
11	18.920	41.58	0.28	10.92	52.78	60.00	-7.22	QP
12	19.122	33.42	0.28	10.92	44.62	50.00	-5.38	Average

Notes:

1. *An initial pre-scan was performed on the live and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Line:



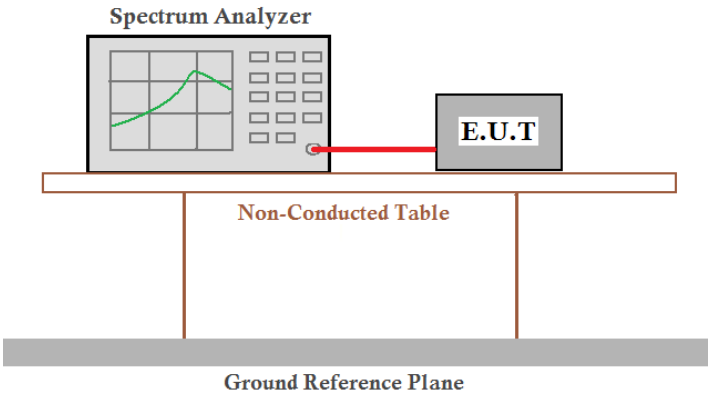

```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN LINE
EUT           : Broadband Digital Transmission System
Model         : NFT 3ac
Test Mode     : TX mode
Power Rating  : AC 120/60Hz
Environment   : Temp: 23 ℃ Huni:56%  Atmos:101KPa
Test Engineer: MT
Remark        : 5G WiFi(POE:G0720-480-050)
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	42.07	0.14	10.78	52.99	65.56	-12.57	QP
2	0.158	32.31	0.14	10.78	43.23	55.56	-12.33	Average
3	0.358	29.95	0.21	10.73	40.89	48.78	-7.89	Average
4	0.385	35.43	0.23	10.72	46.38	48.17	-1.79	Average
5	0.402	41.29	0.24	10.72	52.25	57.81	-5.56	QP
6	0.410	35.52	0.24	10.72	46.48	47.64	-1.16	Average
7	0.683	32.93	0.31	10.77	44.01	56.00	-11.99	QP
8	0.731	26.45	0.31	10.78	37.54	46.00	-8.46	Average
9	1.172	31.87	0.27	10.89	43.03	56.00	-12.97	QP
10	3.584	33.05	0.34	10.90	44.29	56.00	-11.71	QP
11	19.122	39.86	0.32	10.92	51.10	60.00	-8.90	QP
12	19.326	31.89	0.33	10.92	43.14	50.00	-6.86	Average

Notes:

1. *An initial pre-scan was performed on the live and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

6.3 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) & (a) (3)
Test Method:	ANSI C63.10: 2013, KDB789033
Limit:	**Band 1:** 1W (For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.) **Band 4:** 1W (If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.).
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1						
Mode	Test CH	Ant. Port	Conducted Output power(dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	22.96	27.30	30.00	Pass
		TX1	22.27			
		TX2	22.33			
	Middle	TX0	22.85	27.28	30.00	Pass
		TX1	22.51			
		TX2	22.15			
	Highest	TX0	22.73	27.20	30.00	Pass
		TX1	22.51			
		TX2	22.01			
802.11n20	Lowest	TX0	22.96	27.30	30.00	Pass
		TX1	22.29			
		TX2	22.31			
	Middle	TX0	22.92	27.31	30.00	Pass
		TX1	22.52			
		TX2	22.15			
	Highest	TX0	22.81	27.22	30.00	Pass
		TX1	22.50			
		TX2	22.01			
802.11n40	Lowest	TX0	23.35	28.15	30.00	Pass
		TX1	23.43			
		TX2	23.35			
	Highest	TX0	23.35	28.08	30.00	Pass
		TX1	23.63			
		TX2	22.92			
802.11ac	Middle	TX0	23.33	28.25	30.00	Pass
		TX1	23.67			
		TX2	23.44			

Remark:
1. *Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.*
2. *The directional Gain of antenna is less than 6 dBi, so the limit of power is 30 dBm.*

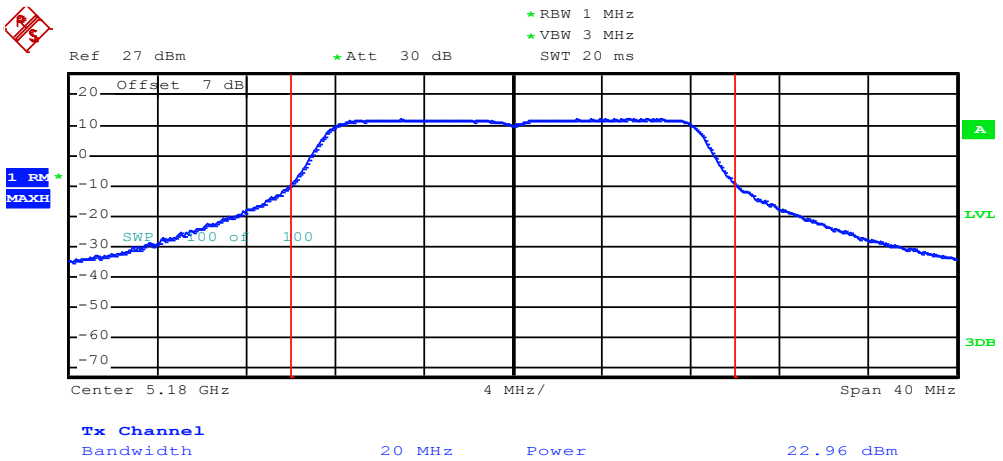
Band 4						
Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	24.19	29.16	30.00	Pass
		TX1	24.58			
		TX2	24.38			
	Middle	TX0	24.41	29.41	30.00	Pass
		TX1	24.81			
		TX2	24.68			
	Highest	TX0	24.62	29.52	30.00	Pass
		TX1	24.88			
		TX2	24.74			
802.11n20	Lowest	TX0	24.63	29.32	30.00	Pass
		TX1	24.73			
		TX2	24.27			
	Middle	TX0	24.48	29.36	30.00	Pass
		TX1	24.85			
		TX2	24.42			
	Highest	TX0	24.85	29.49	30.00	Pass
		TX1	24.62			
		TX2	24.69			
802.11n40	Lowest	TX0	24.05	29.06	30.00	Pass
		TX1	24.25			
		TX2	24.56			
	Highest	TX0	24.30	29.06	30.00	Pass
		TX1	24.24			
		TX2	24.33			
802.11ac	Middle	TX0	24.14	29.02	30.00	Pass
		TX1	24.47			
		TX2	24.14			

Remark:
1. *Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.*
2. *The directional Gain of antenna is less than 6 dBi, so the limit of power is 30 dBm.*

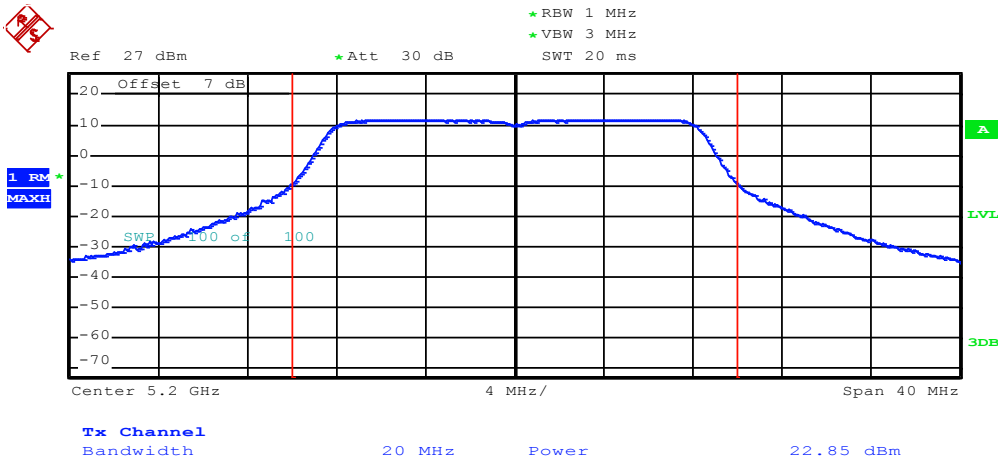
Band 1

TX0

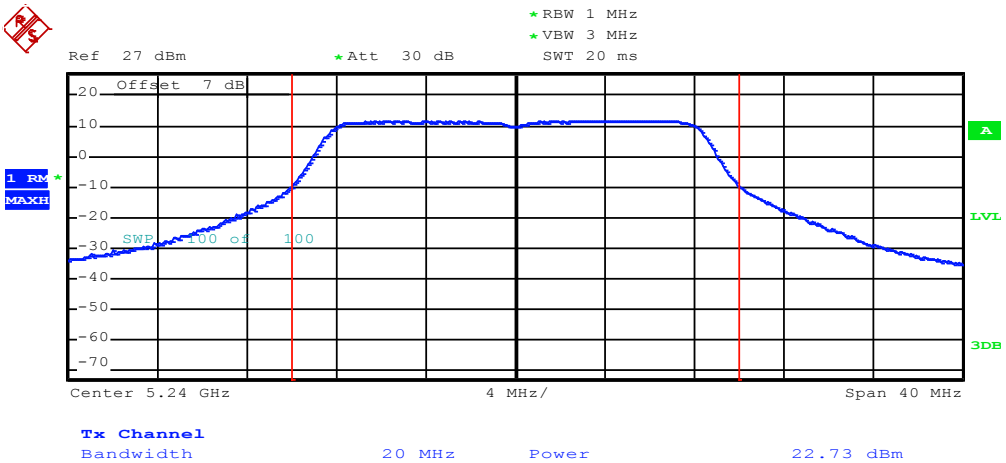
802.11a



Lowest channel

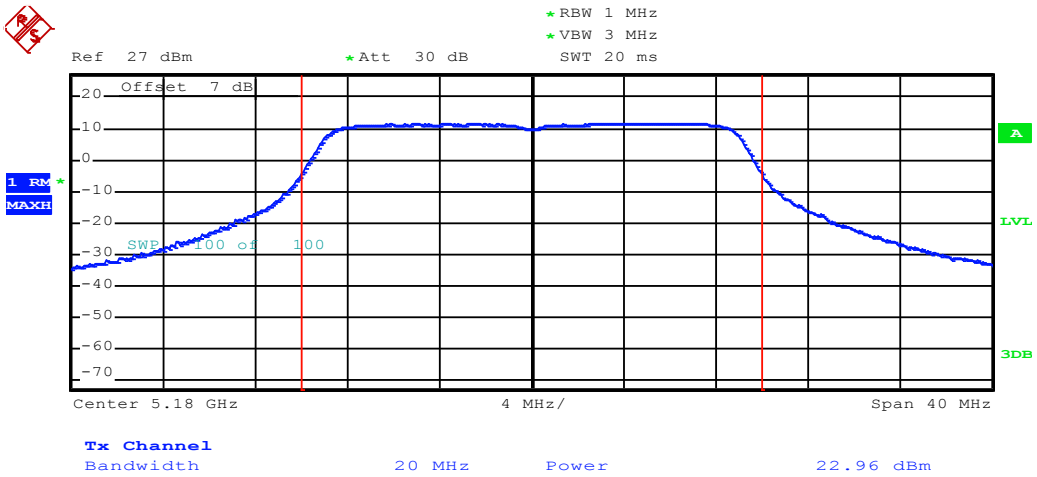


Middle channel

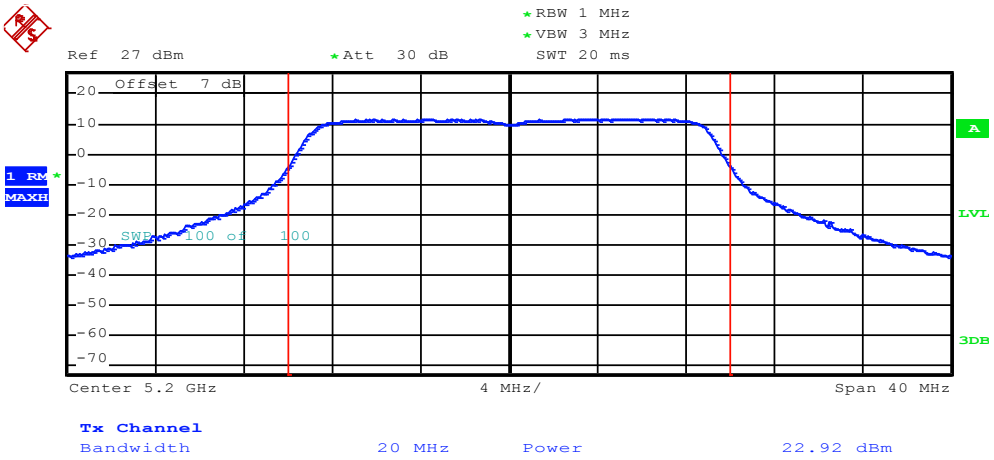


Highest channel

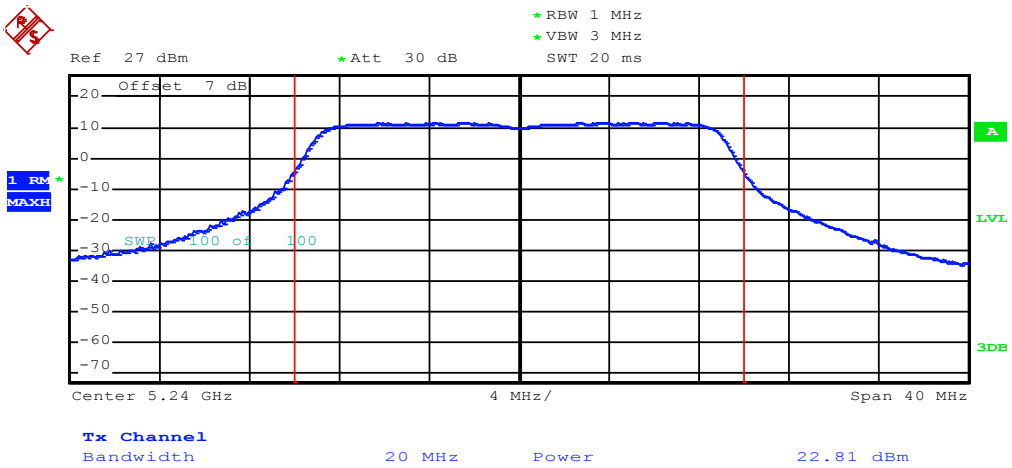
802.11n20



Lowest channel

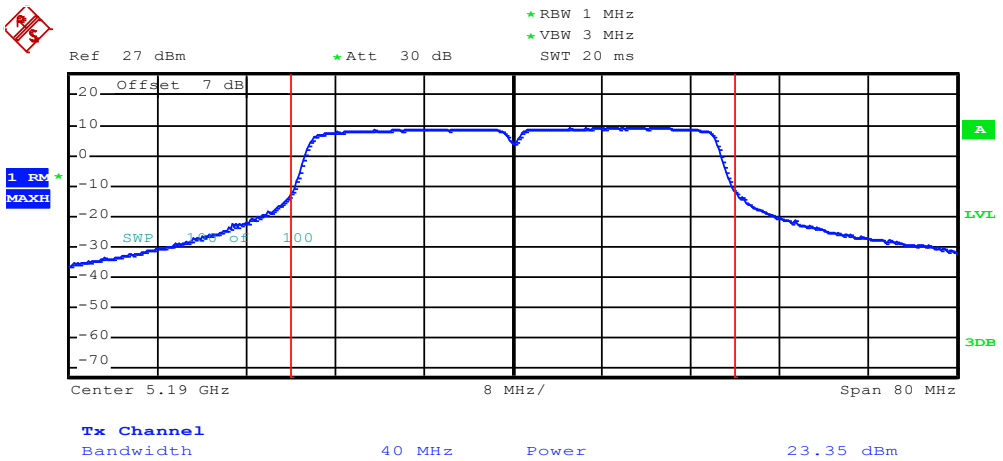


Middle channel

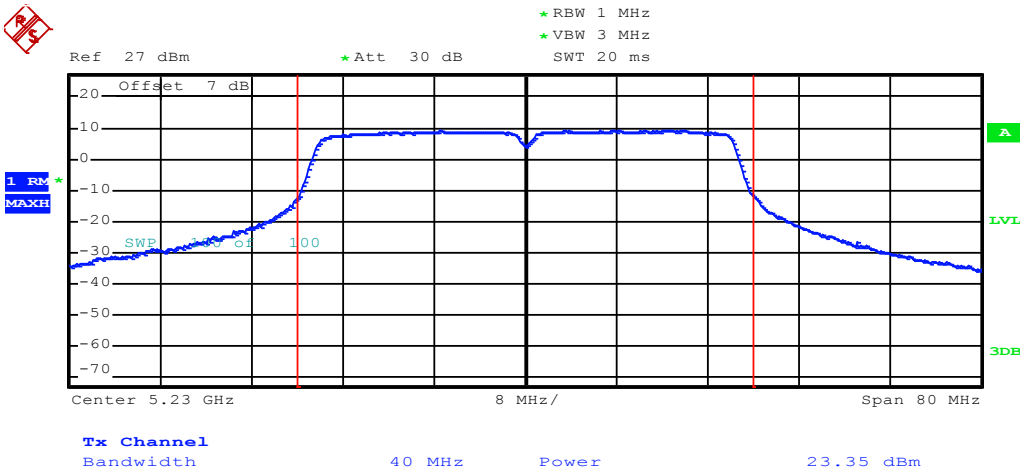


Highest channel

802.11n40

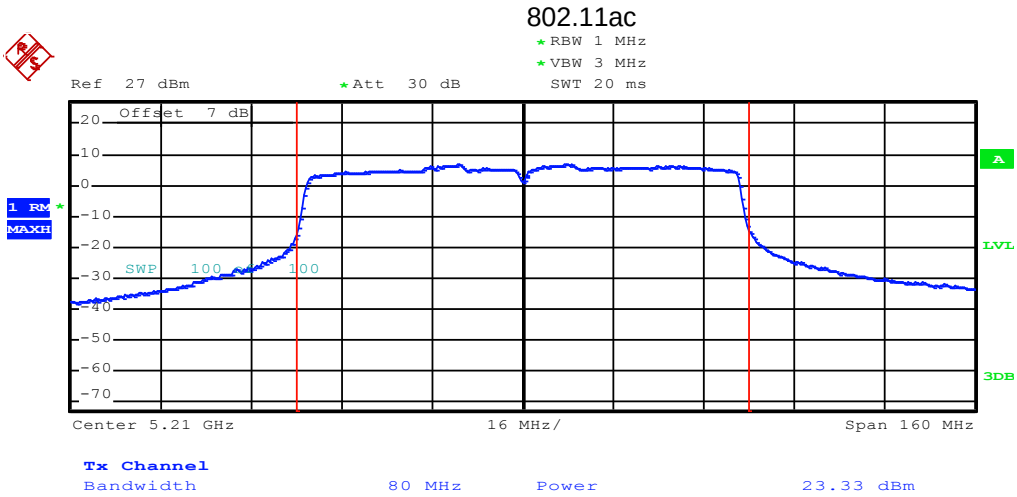


Lowest channel



Highest channel

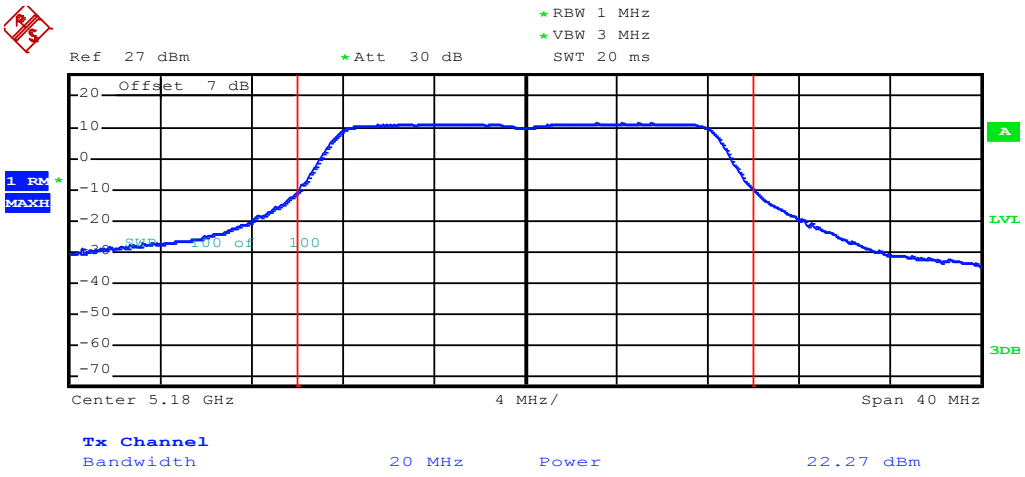
802.11ac



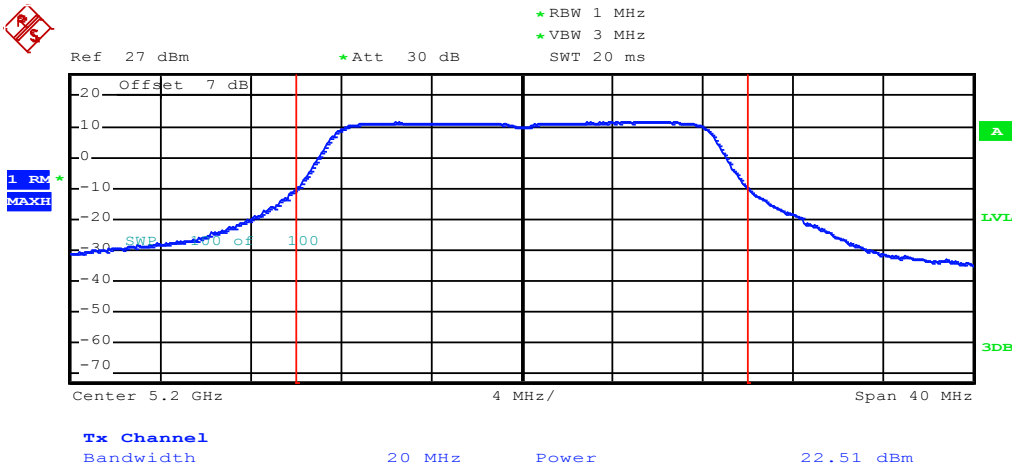
Middle channel

TX1

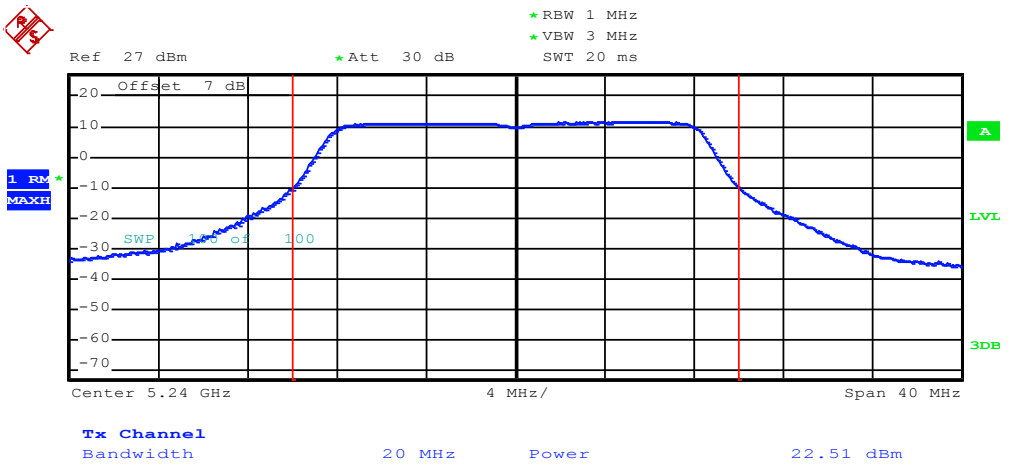
802.11a



Lowest channel

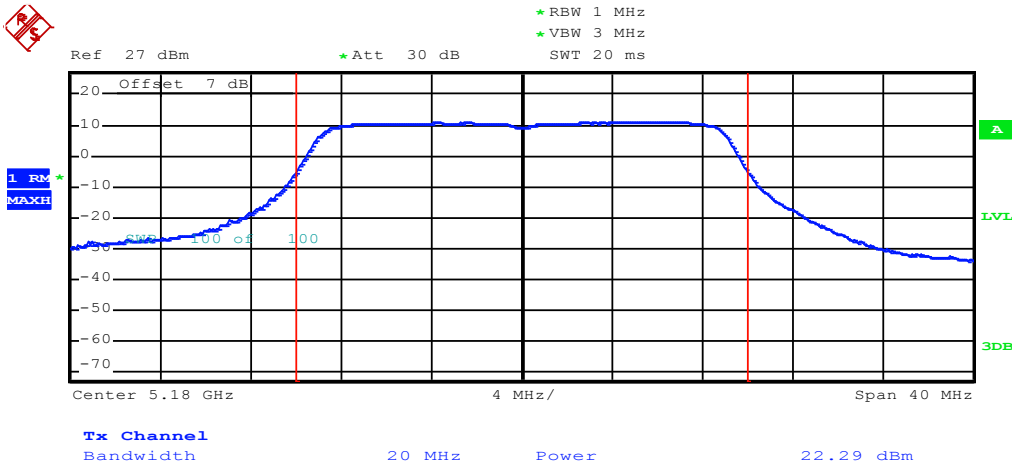


Middle channel

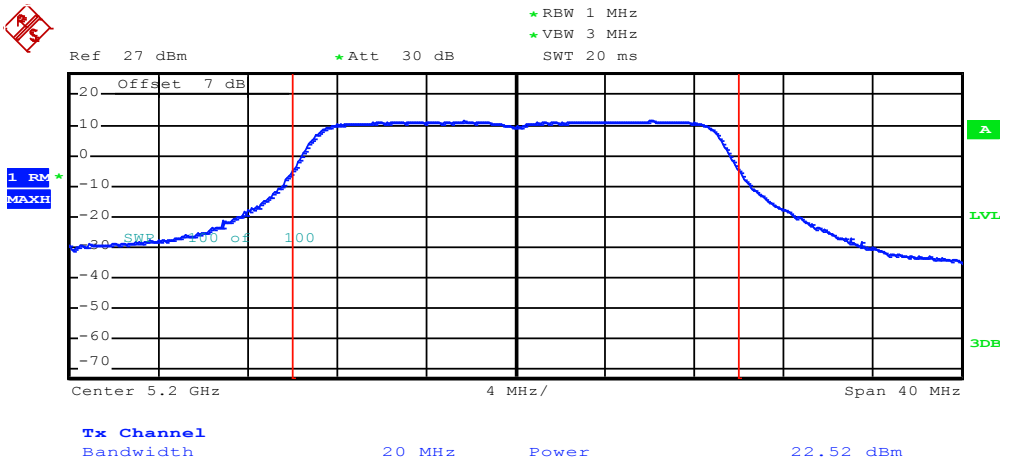


Highest channel

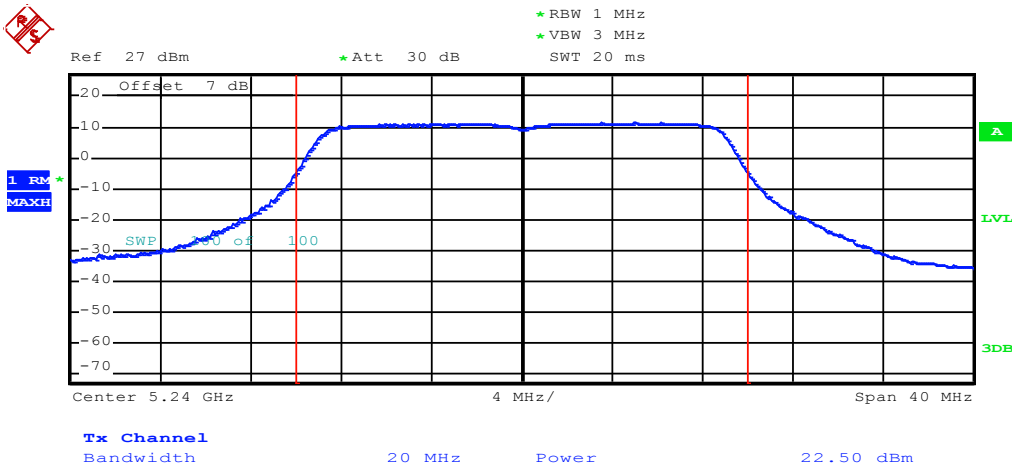
802.11n20



Lowest channel

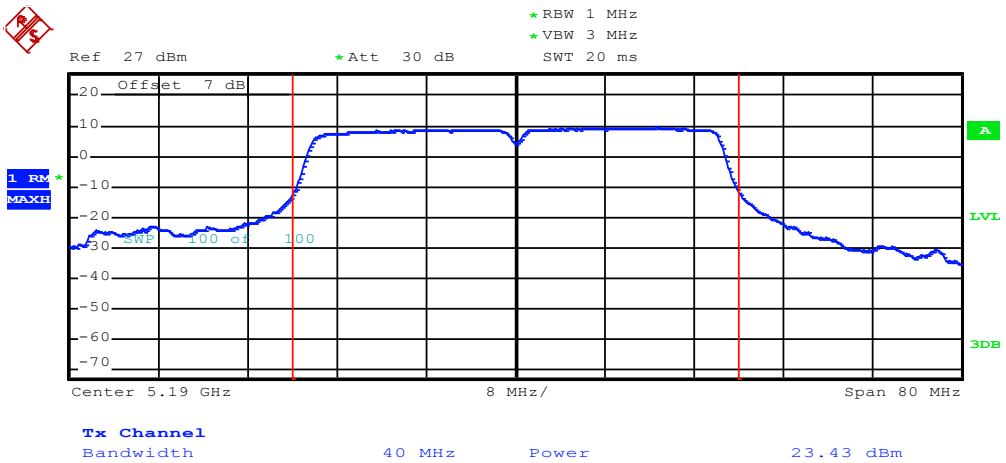


Middle channel



Highest channel

802.11n40



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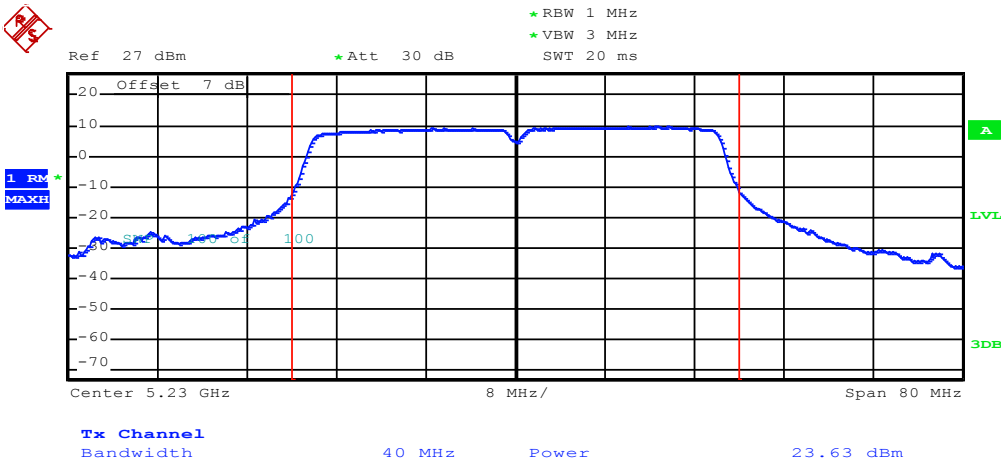
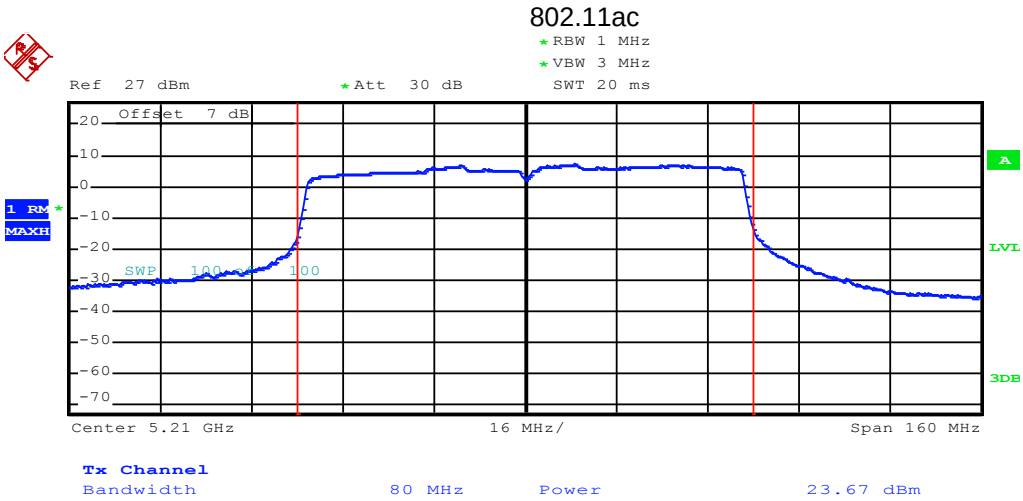


Highest channel

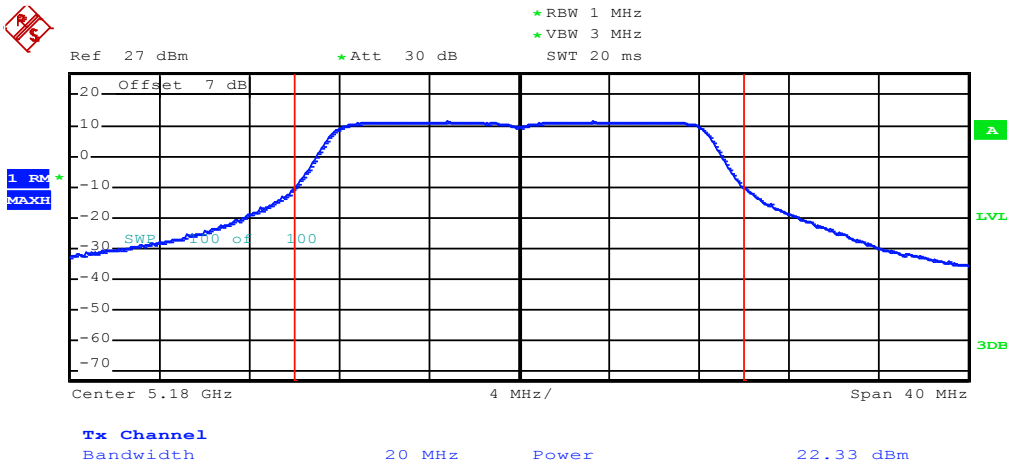
802.11ac



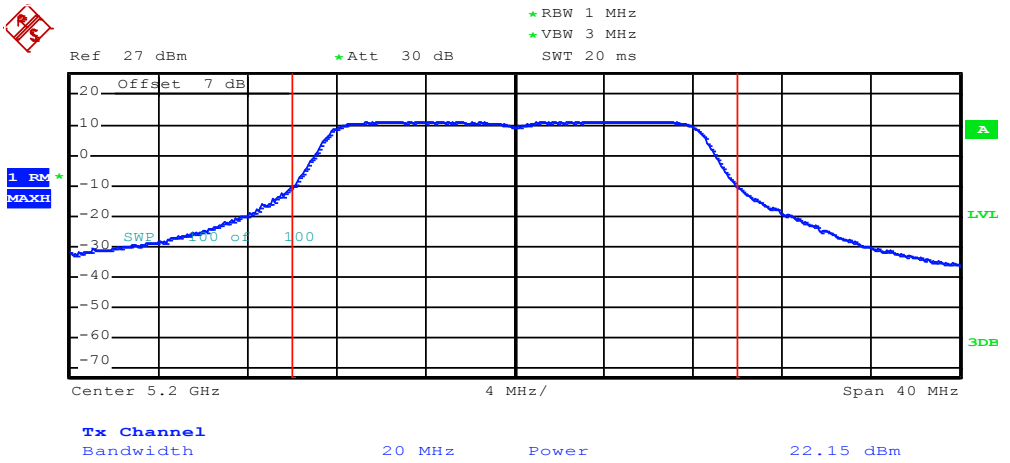
Middle channel

TX2

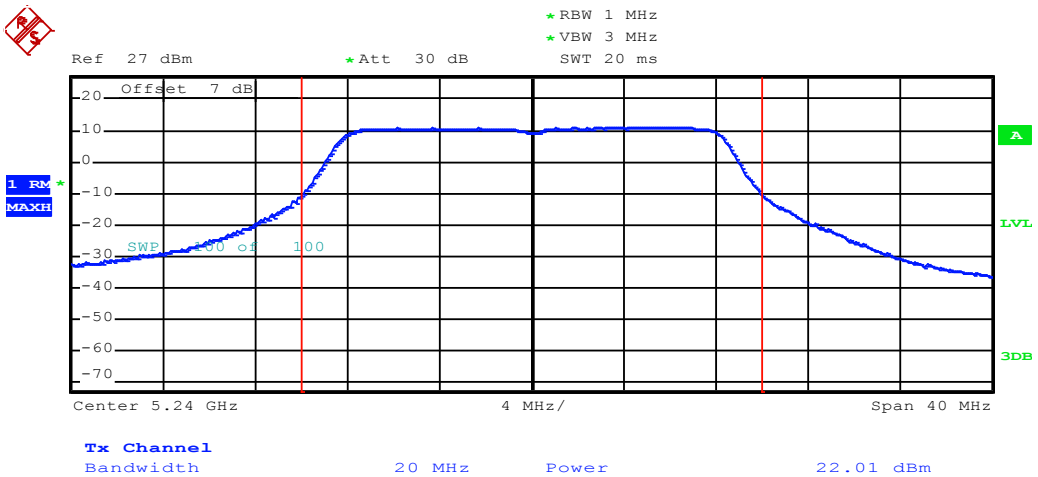
802.11a



Lowest channel

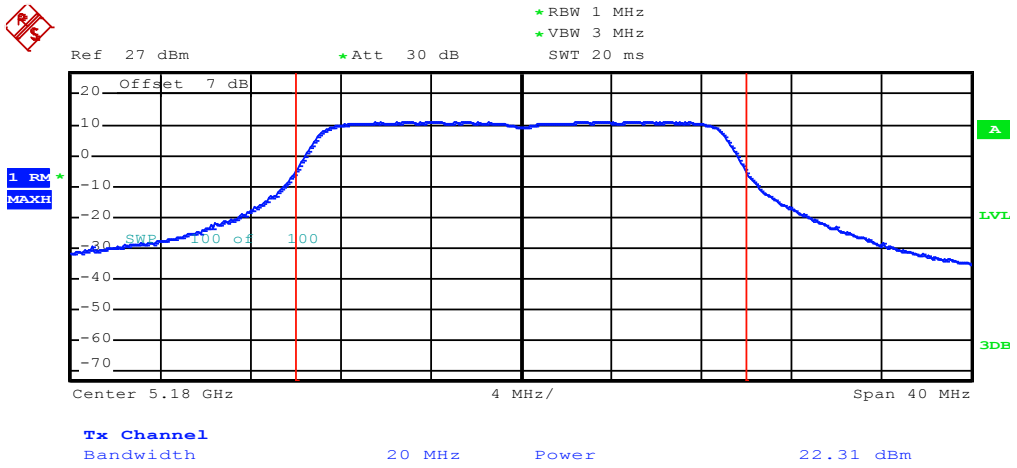


Middle channel

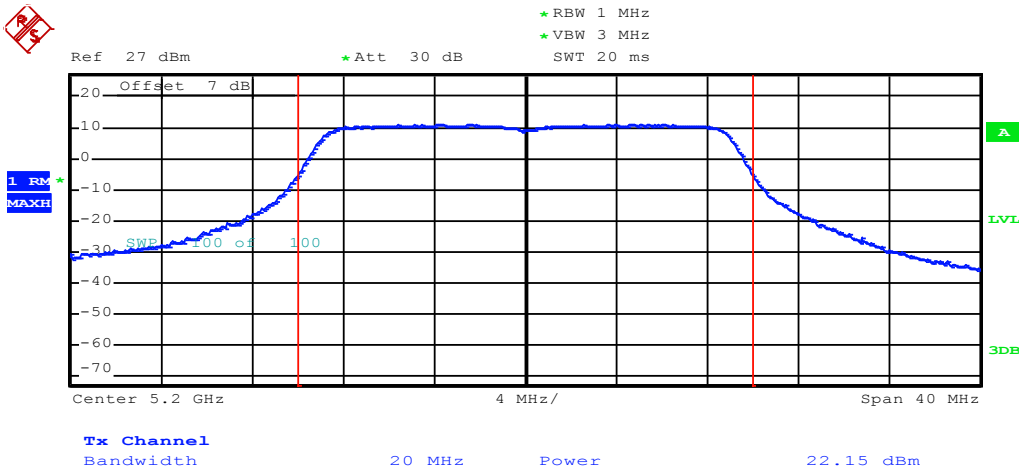


Highest channel

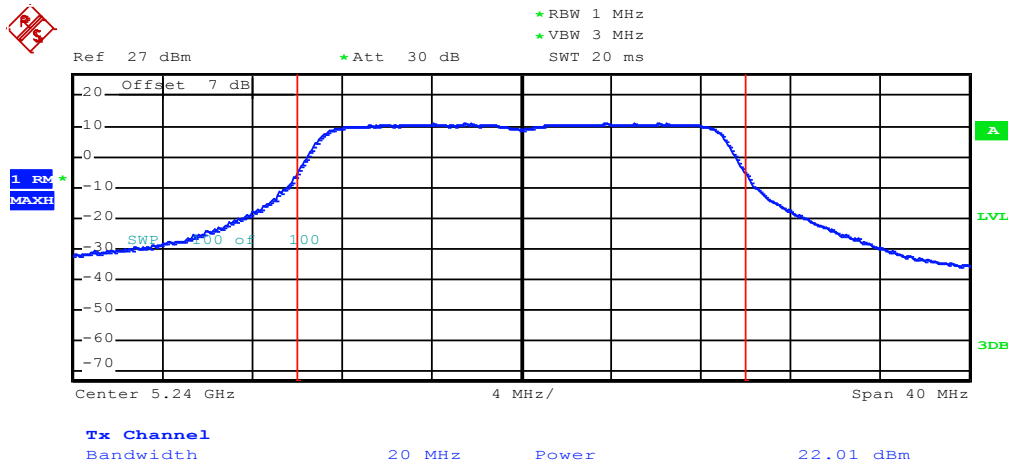
802.11n20



Lowest channel

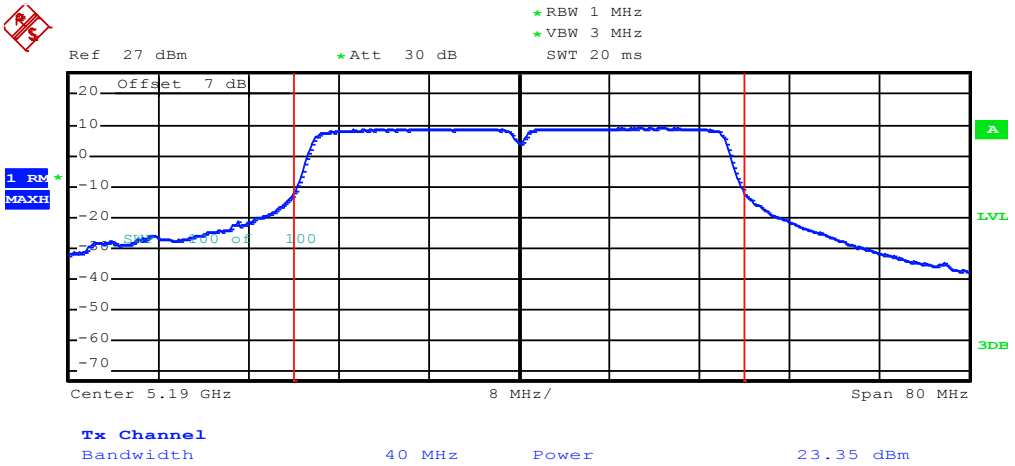


Middle channel

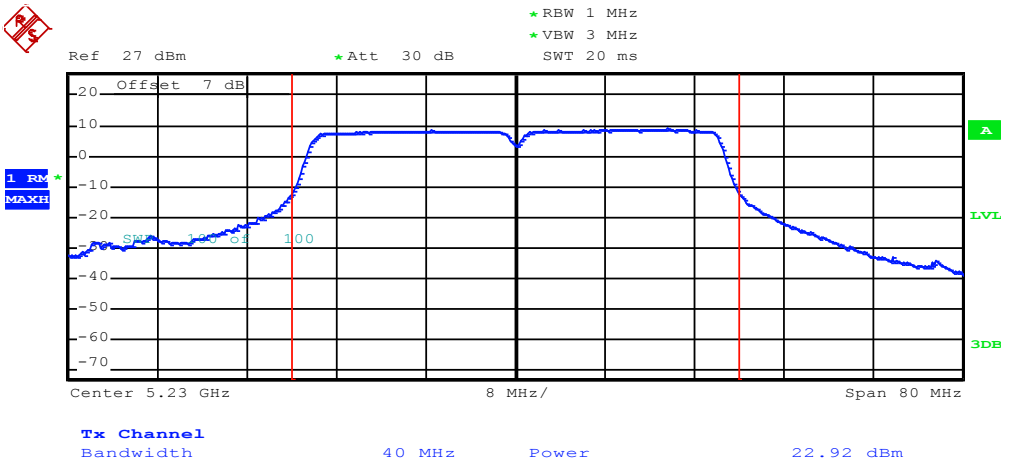


Highest channel

802.11n40

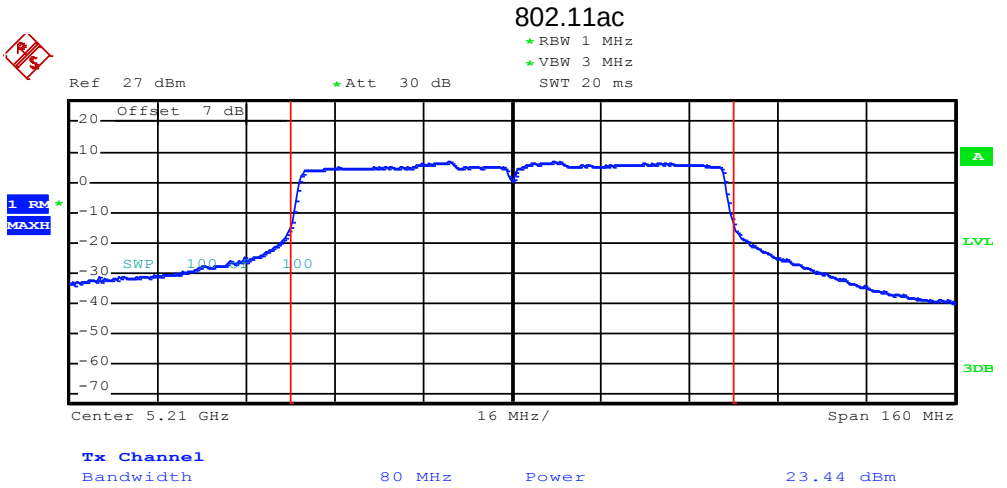


Lowest channel



Highest channel

802.11ac

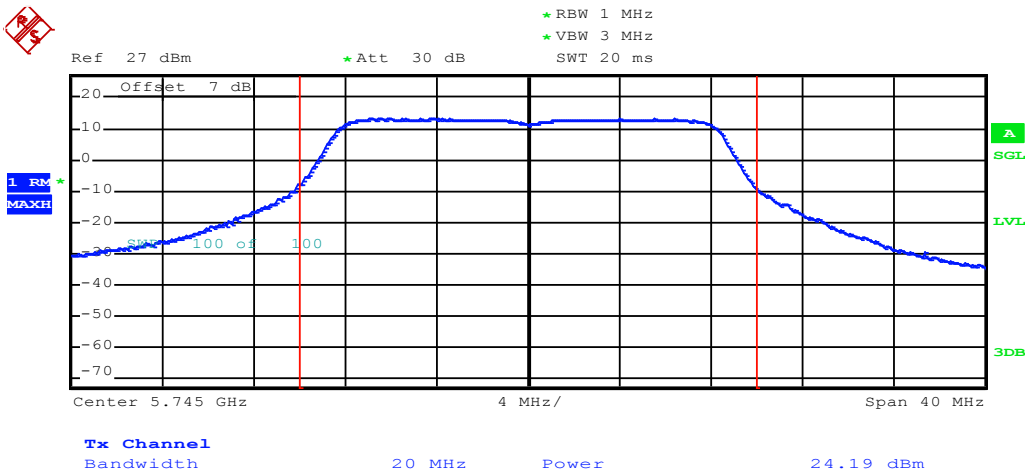


Middle channel

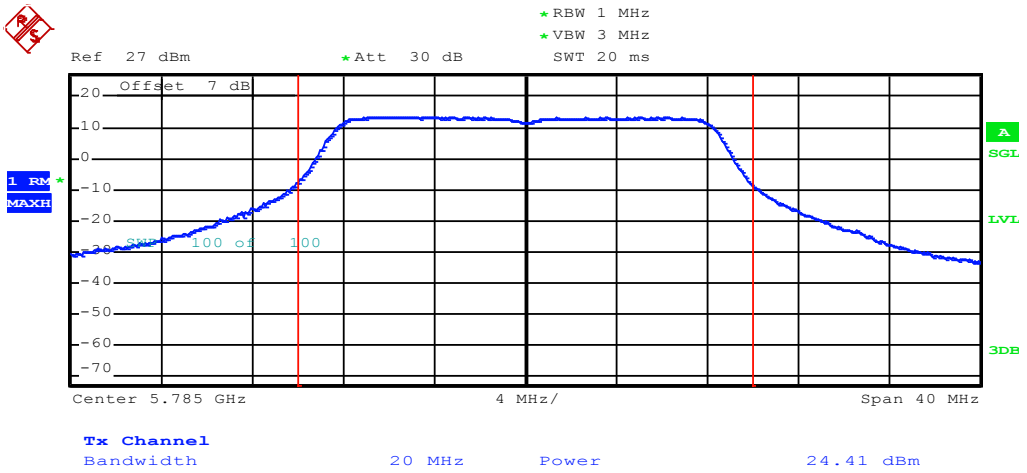
Band 4:

TX0

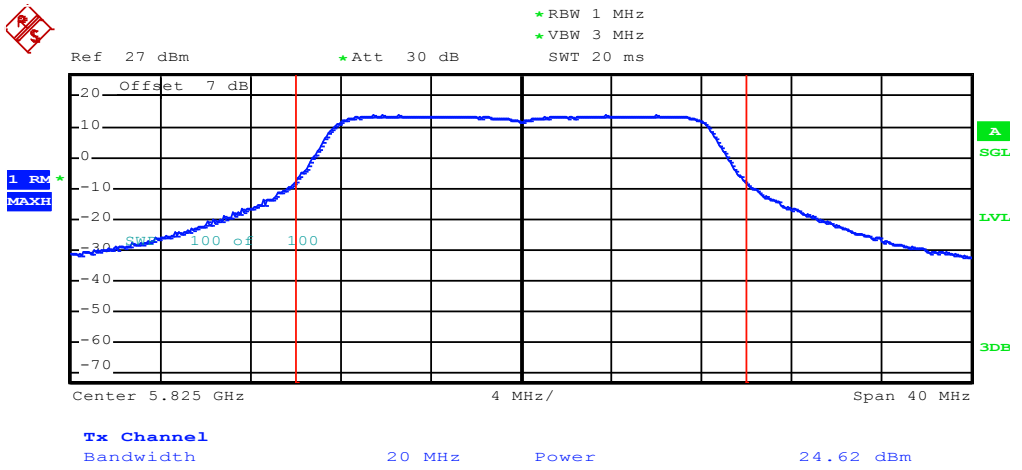
802.11a



Lowest channel

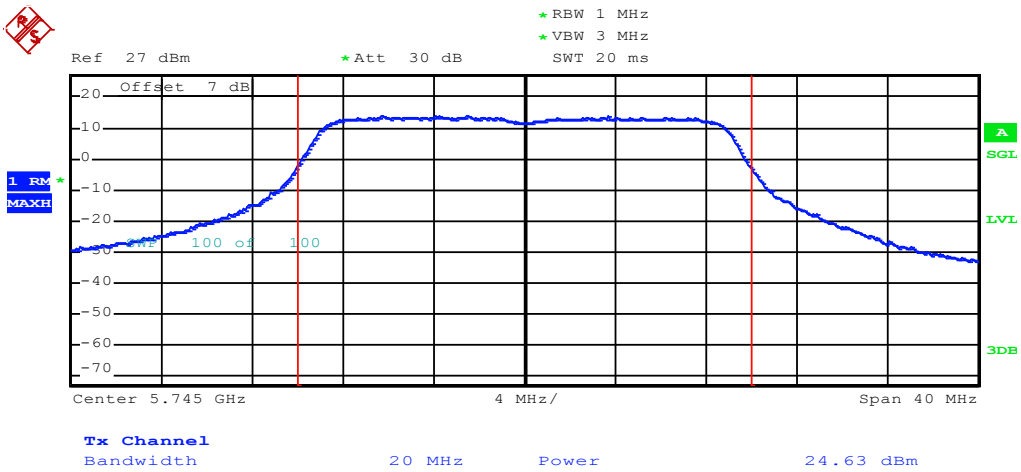


Middle channel

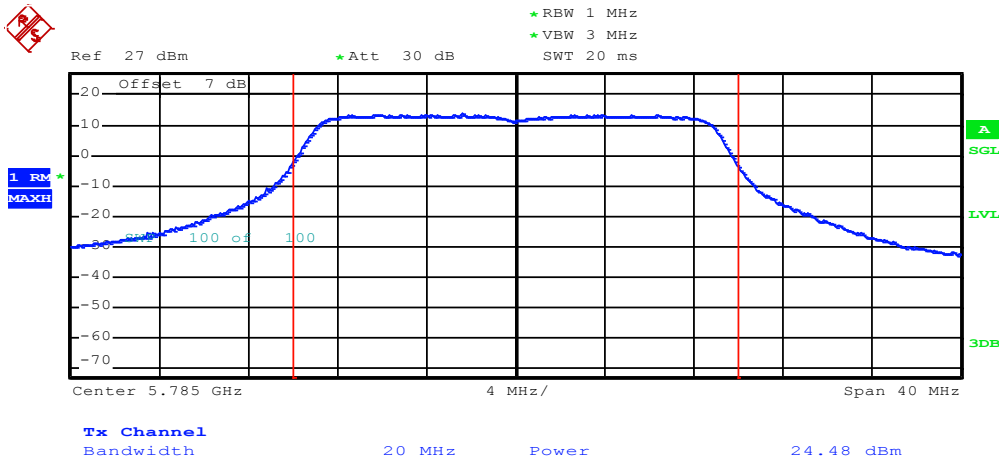


Highest channel

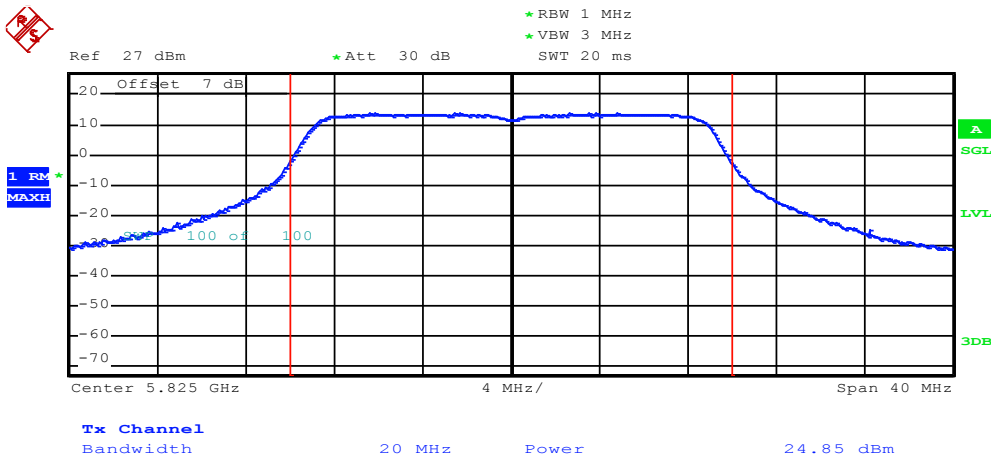
802.11n20



Lowest channel

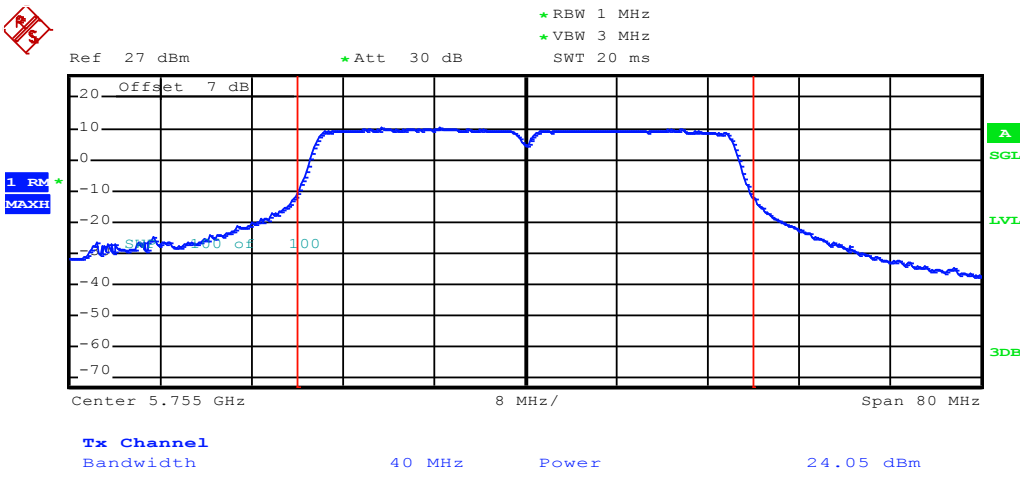


Middle channel

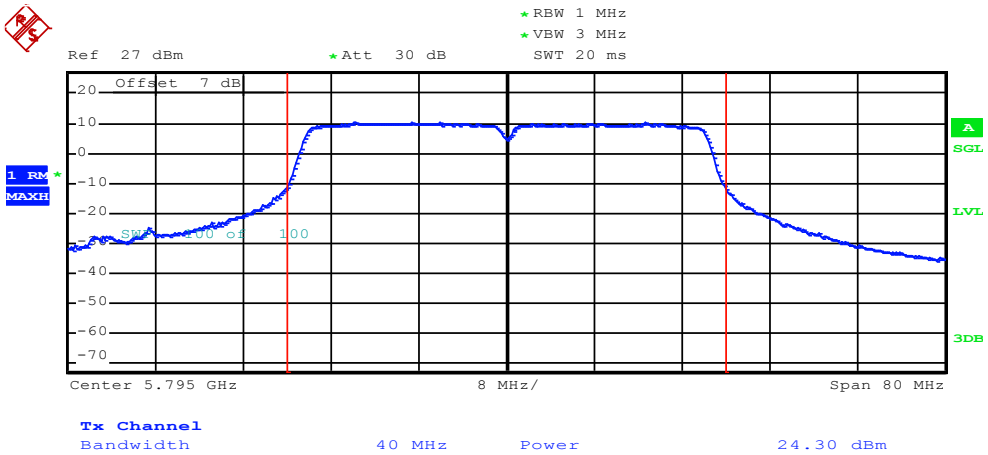


Highest channel

802.11n40

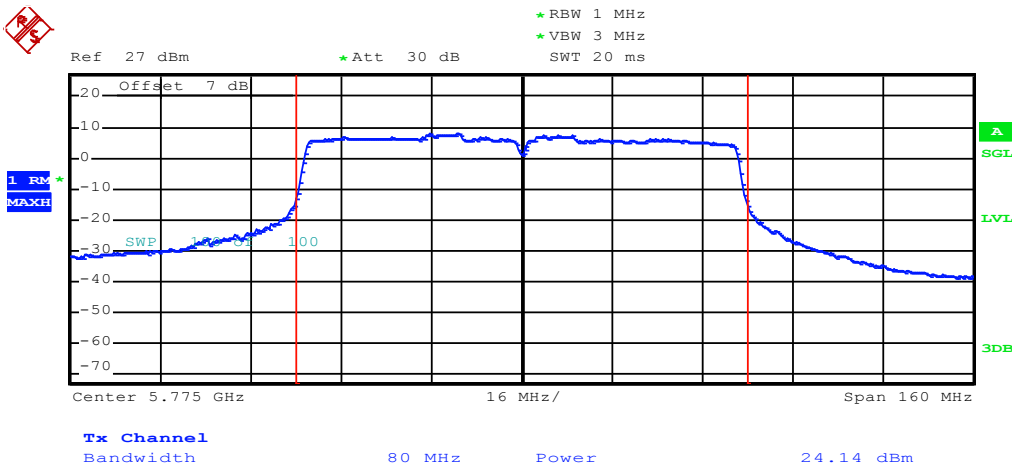


Lowest channel



Highest channel

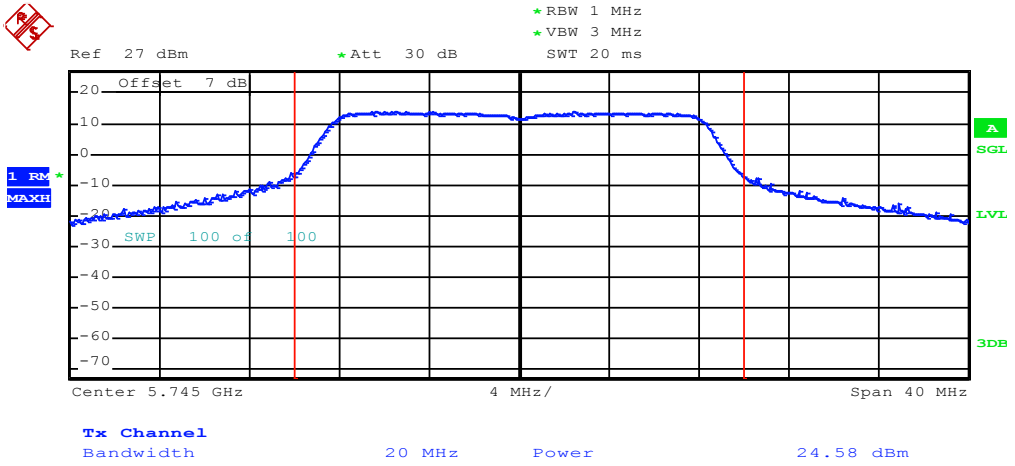
802.11ac



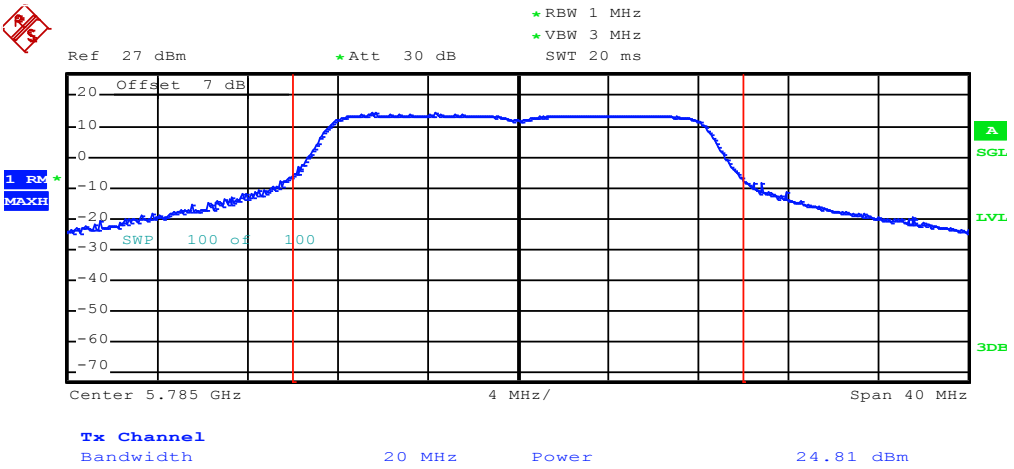
Middle channel

TX1

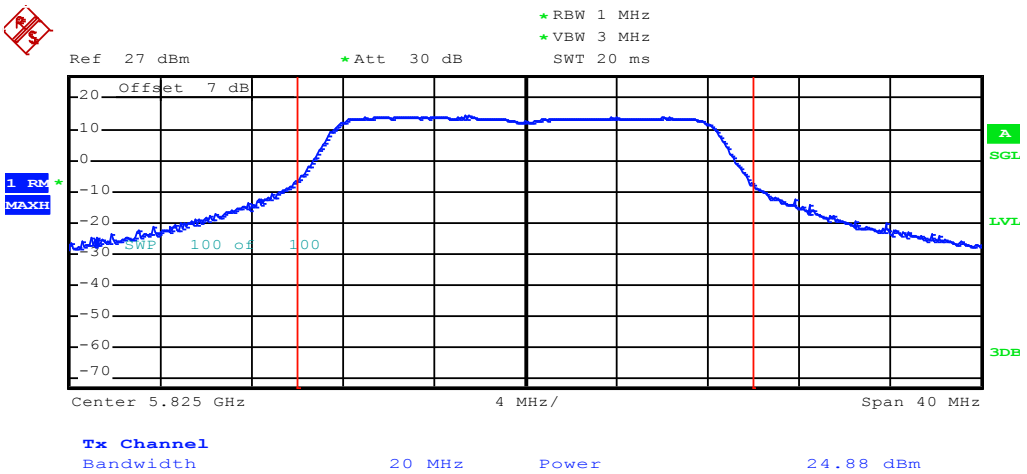
802.11a



Lowest channel

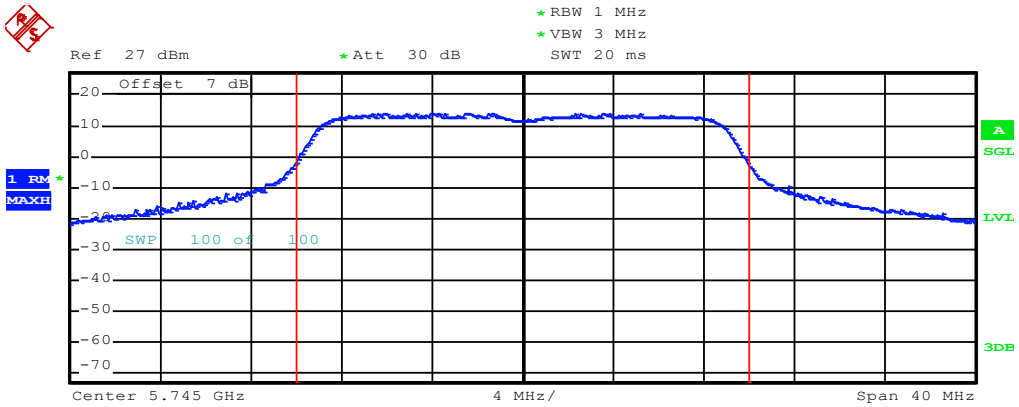


Middle channel



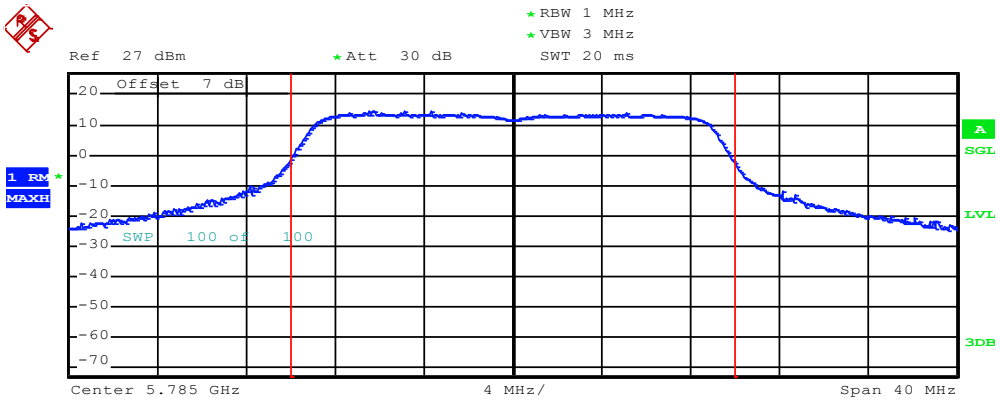
Highest channel

802.11n20



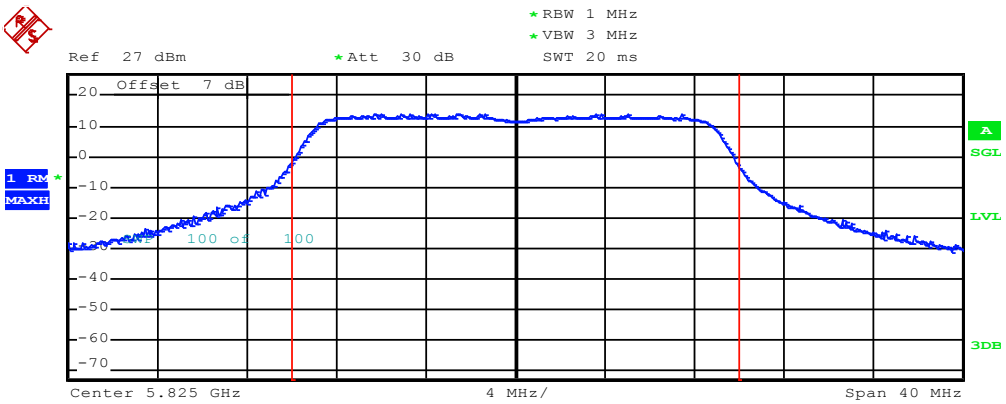
Tx Channel
Bandwidth 20 MHz Power 24.73 dBm

Lowest channel



Tx Channel
Bandwidth 20 MHz Power 24.85 dBm

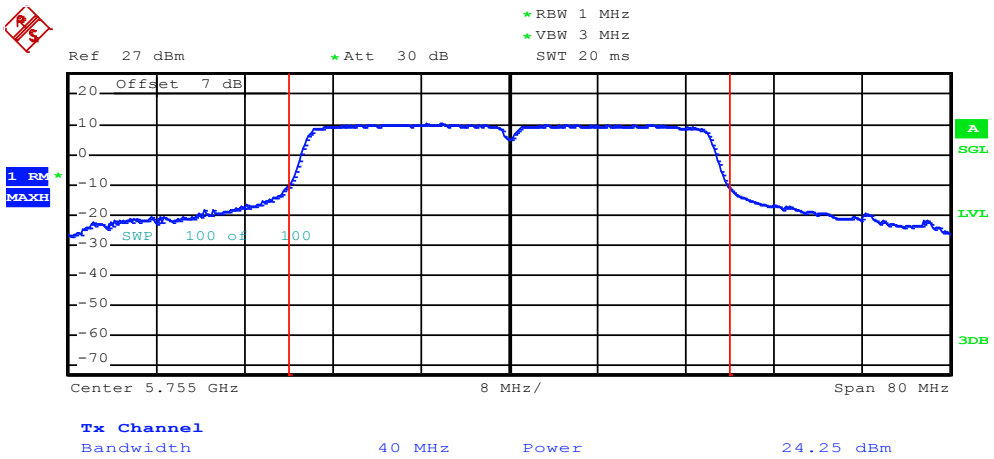
Middle channel



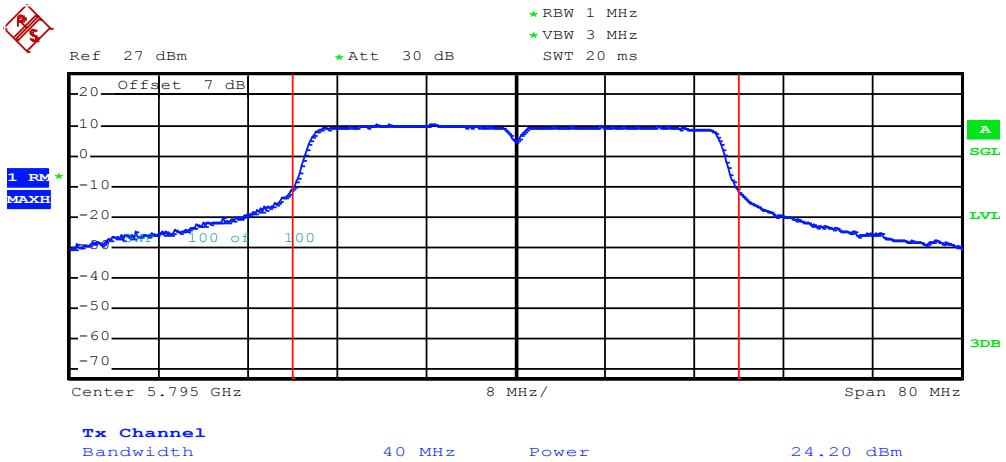
Tx Channel
Bandwidth 20 MHz Power 24.62 dBm

Highest channel

802.11n40

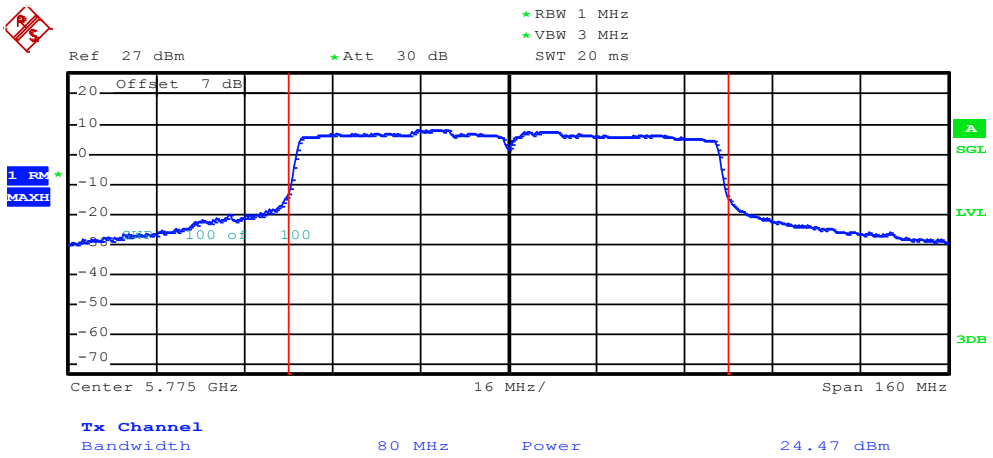


Lowest channel



Highest channel

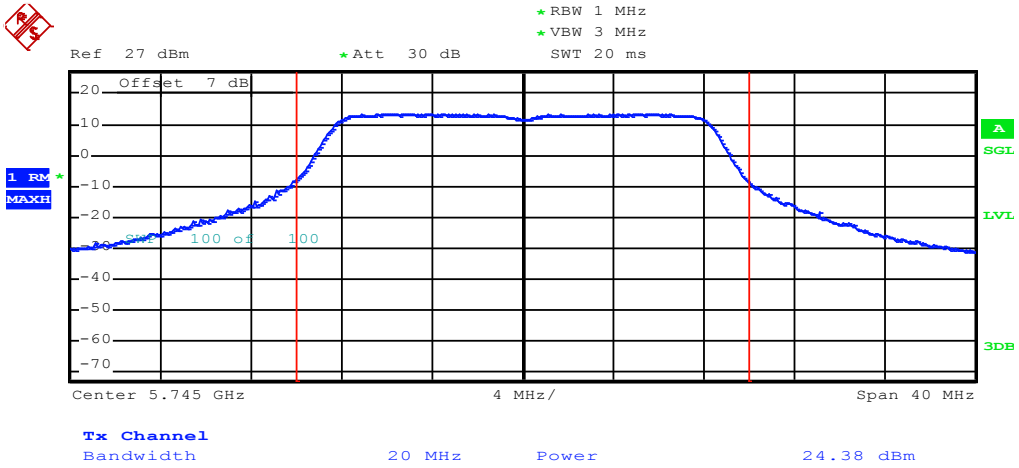
802.11ac



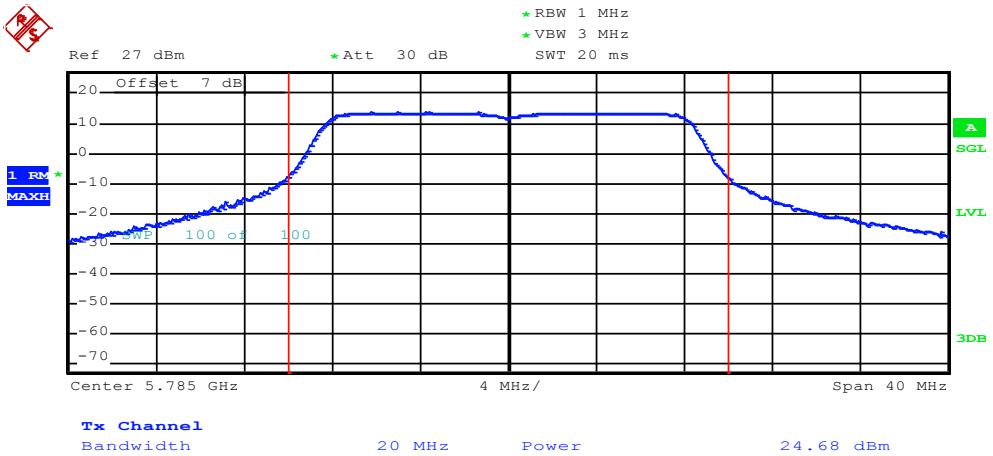
Middle channel

TX2

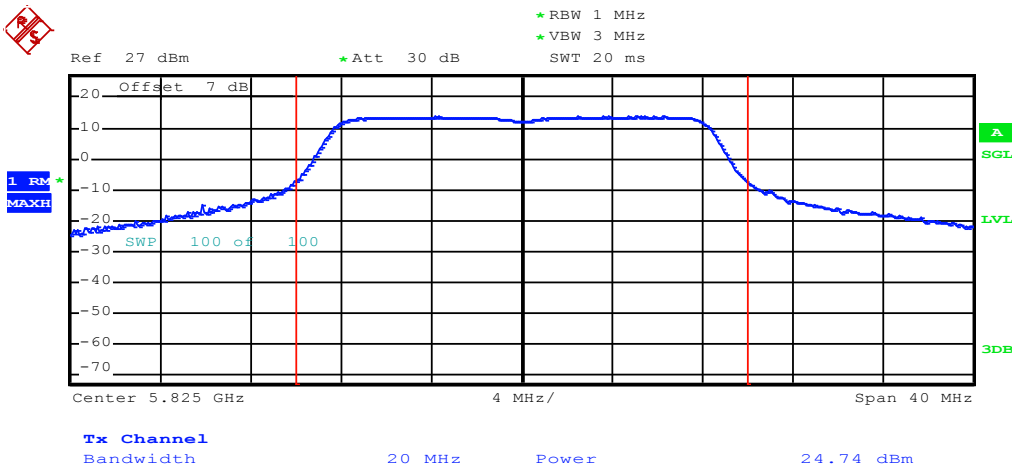
802.11a



Lowest channel

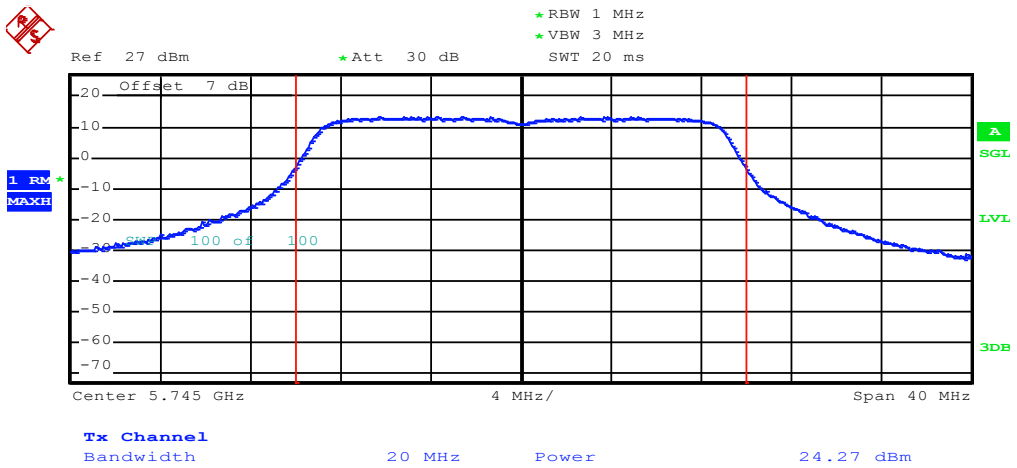


Middle channel

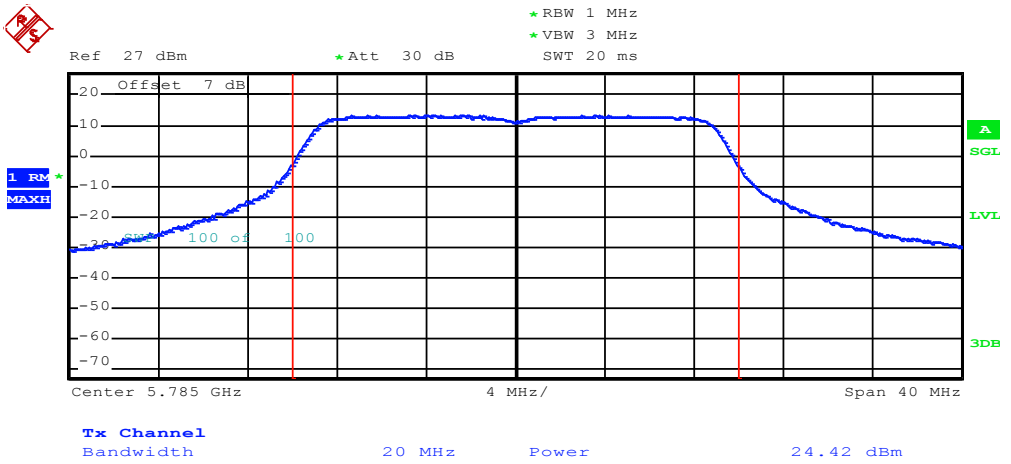


Highest channel

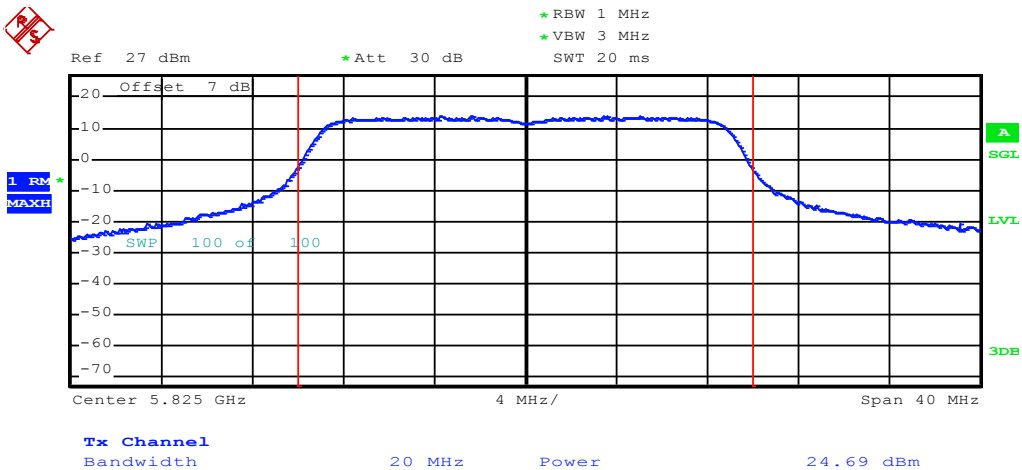
802.11n20



Lowest channel

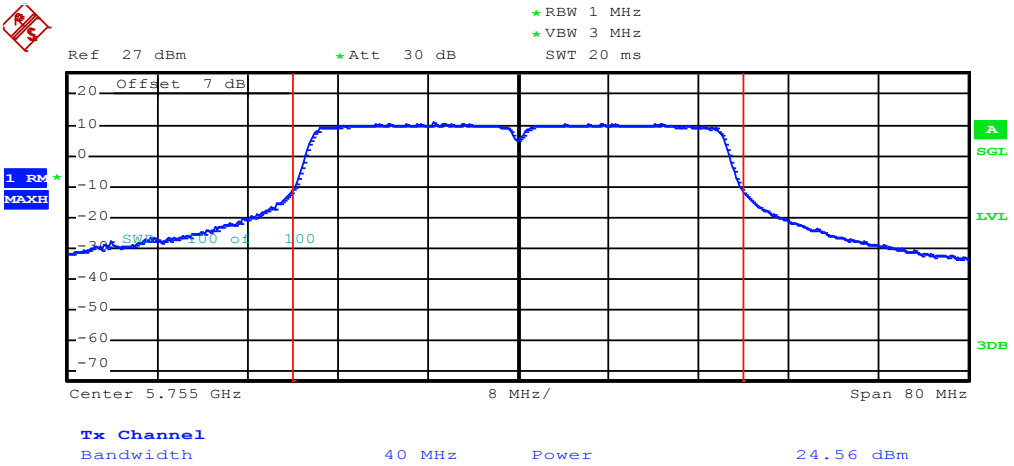


Middle channel

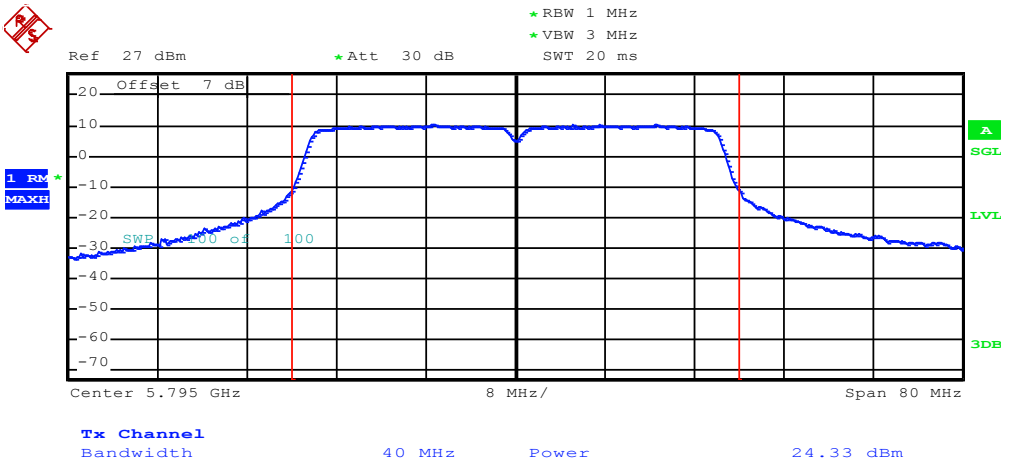


Highest channel

802.11n40

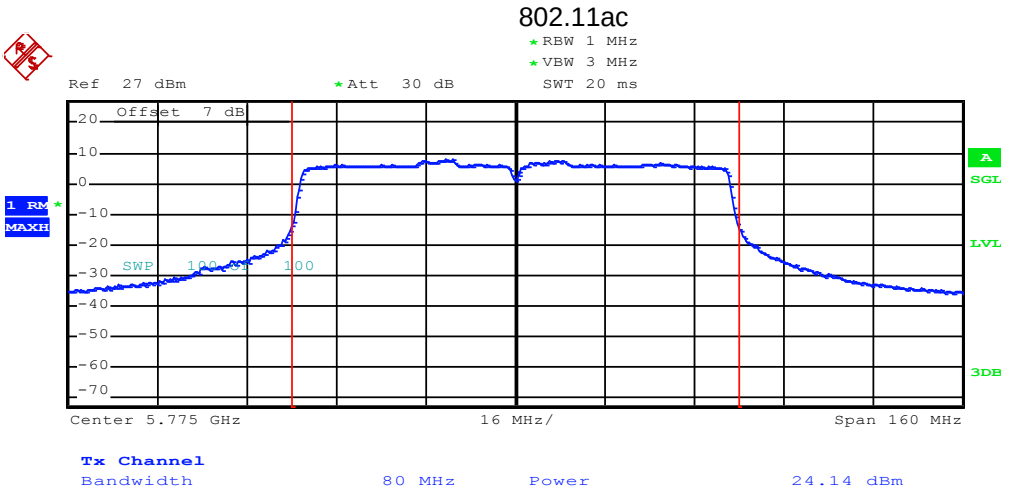


Lowest channel



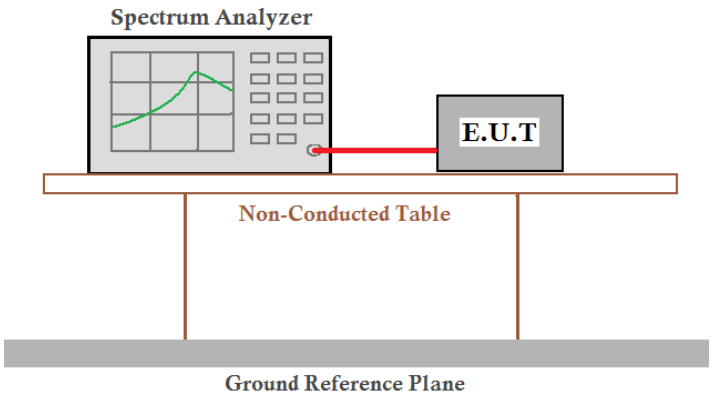
Highest channel

802.11ac



Middle channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407 (a) (5) and Section 15.407 (e)
Test Method:	ANSI C63.10:2013 and KDB 789033
Limit:	Band 1: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: >500kHz(6dB Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1:

Test Channel	26dB Emission Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	23.60	23.44	43.04	---	N/A	N/A
Middle	23.60	24.00	---	85.12		
Highest	22.88	23.28	44.00	---		
Test Channel	99% Occupy Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	17.04	18.16	36.32	---	N/A	N/A
Middle	17.04	18.16	---	75.84		
Highest	17.04	18.16	36.32	---		

Band 4:

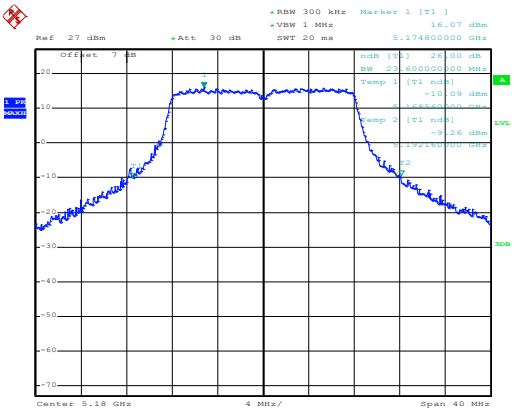
Test Channel	26dB Emission Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	22.56	23.12	43.84	---	N/A	N/A
Middle	22.24	22.96	---	83.20		
Highest	22.88	22.72	43.52	---		
Test Channel	99% Occupy Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	16.96	18.08	36.48	---	N/A	N/A
Middle	16.96	18.08	---	76.16		
Highest	16.96	18.00	36.48	---		
Test Channel	6dB Emission Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	16.56	17.68	36.32	---	>500kHz	N/A
Middle	16.56	17.68	---	76.48		
Highest	16.56	17.76	36.16	---		

Note: Only 80 MHz Bandwidth support by 802.11ac mode.

Test plot as follows:

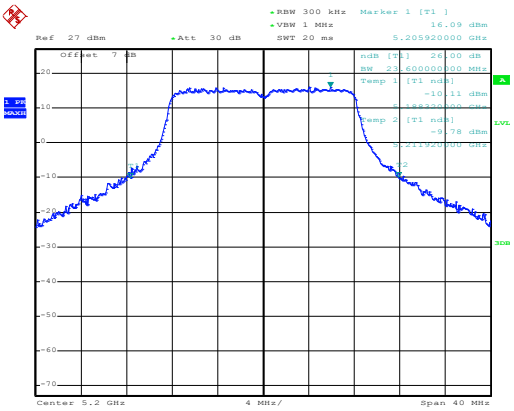
Band 1:

26 dB EBW - 802.11a



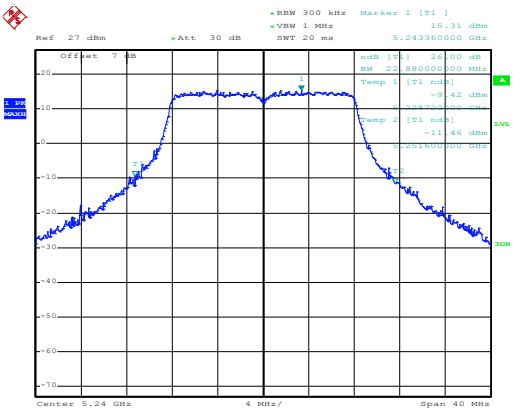
Date: 16.JUN.2016 11:13:16

Lowest channel



Date: 16.JUN.2016 11:15:38

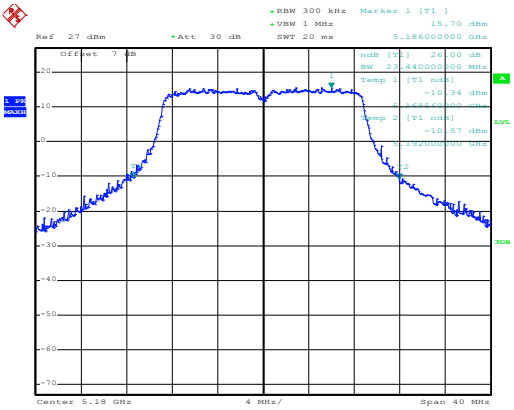
Middle channel



Date: 16.JUN.2016 11:16:38

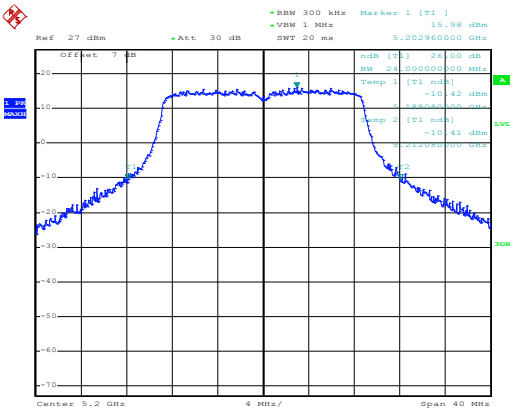
Highest channel

802.11n20



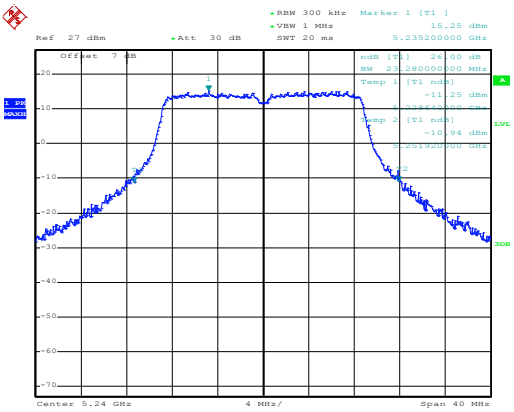
Date: 16.JUN.2016 11:35:41

Lowest channel



Date: 16.JUN.2016 11:36:43

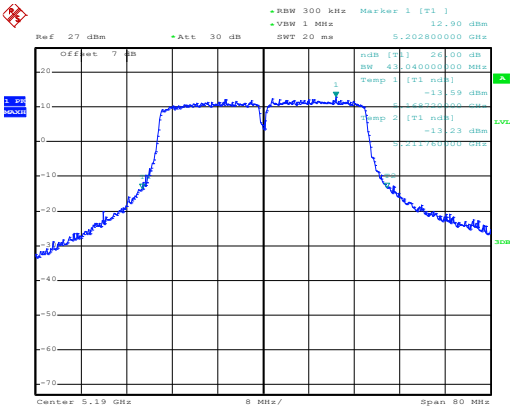
Middle channel



Date: 16.JUN.2016 11:37:22

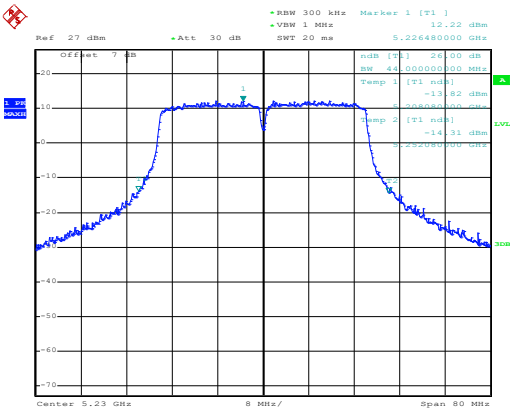
Highest channel

802.11n40



Date: 16.JUN.2016 11:39:43

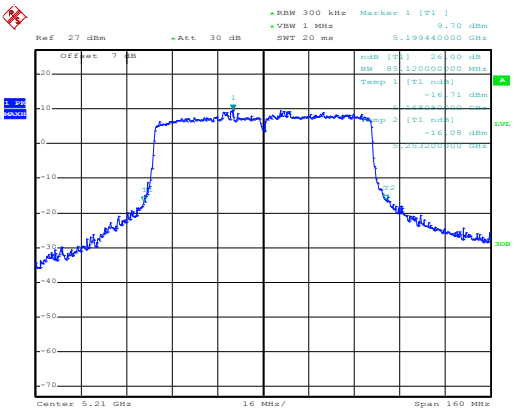
Lowest channel



Date: 16.JUN.2016 11:41:16

Highest channel

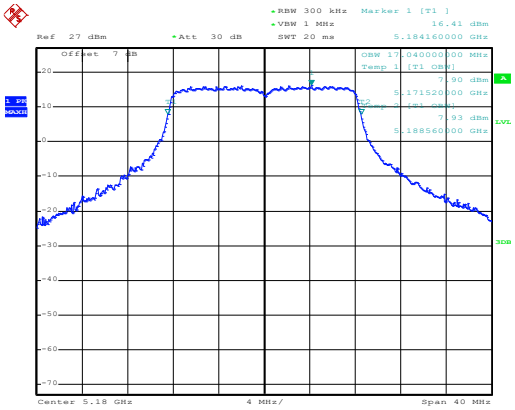
802.11ac



Date: 16.JUN.2016 11:50:17

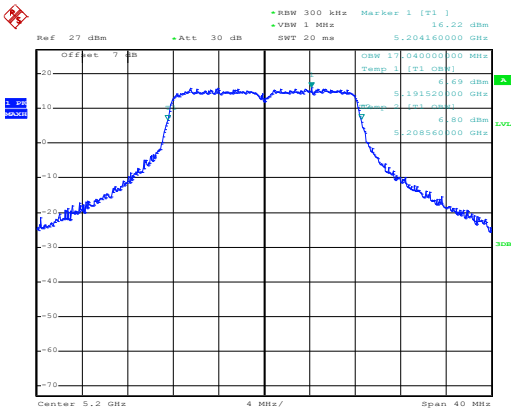
Middle channel

99% OBW - 802.11a



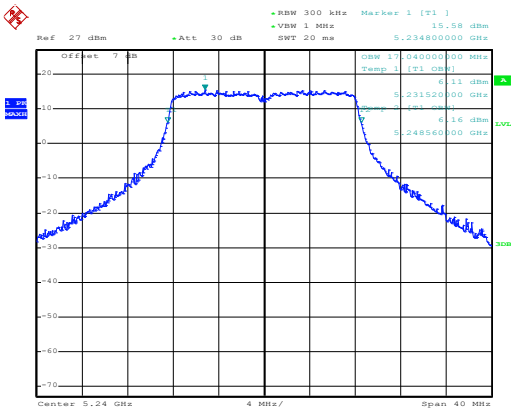
Date: 16.JUN.2016 11:12:05

Lowest channel



Date: 16.JUN.2016 11:15:51

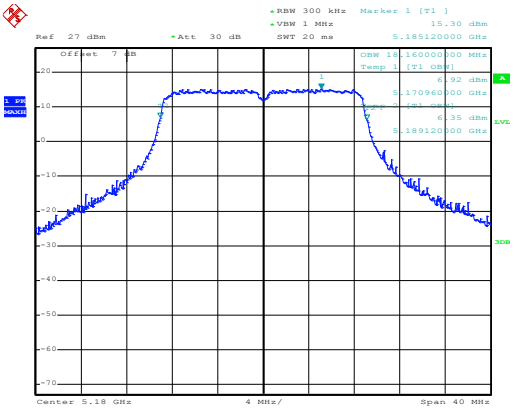
Middle channel



Date: 16.JUN.2016 11:16:27

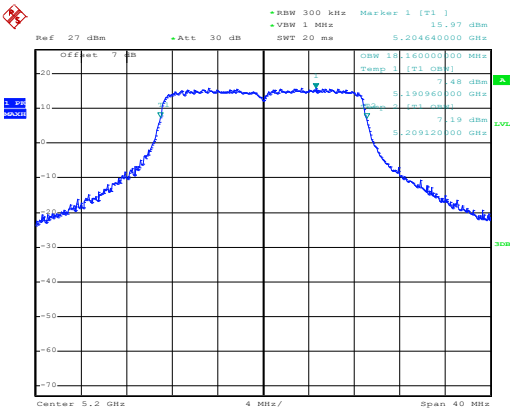
Highest channel

802.11n20



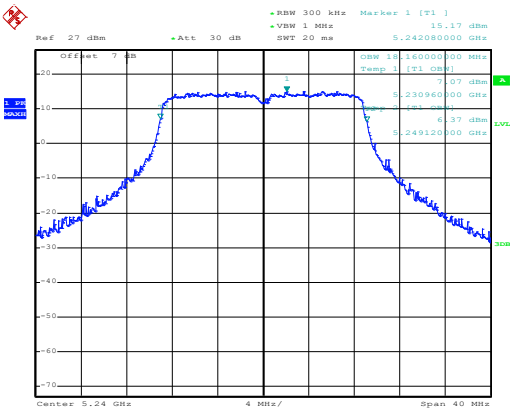
Date: 16.JUN.2016 11:35:53

Lowest channel



Date: 16.JUN.2016 11:36:29

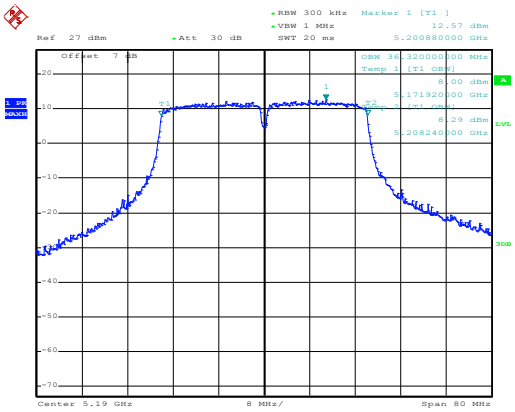
Middle channel



Date: 16.JUN.2016 11:37:35

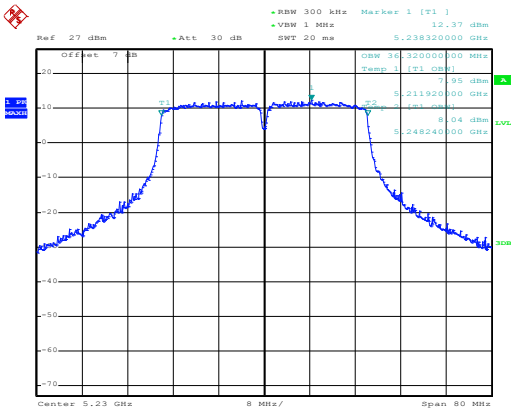
Highest channel

802.11n40



Date: 16.JUN.2016 11:39:32

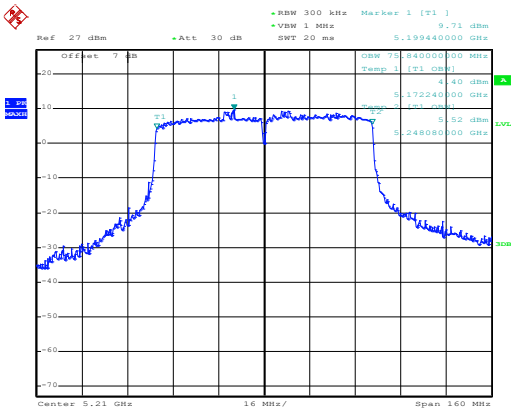
Lowest channel



Date: 16.JUN.2016 11:41:28

Highest channel

802.11ac

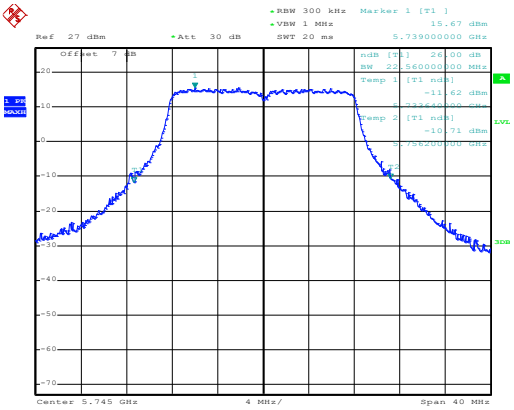


Date: 16.JUN.2016 11:50:27

Middle channel

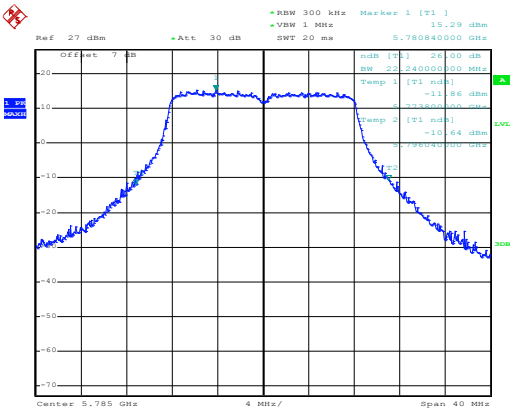
Band 4:

26 dB EBW - 802.11a



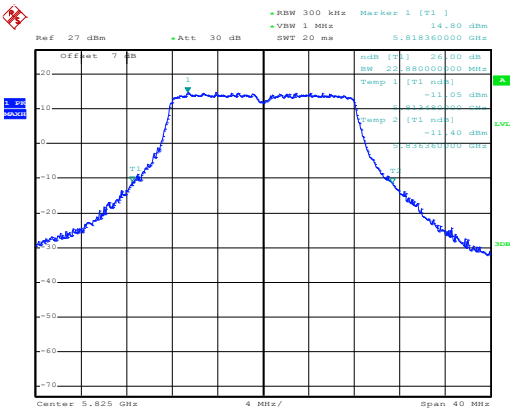
Date: 16.JUN.2016 11:17:45

Lowest channel



Date: 16.JUN.2016 11:18:43

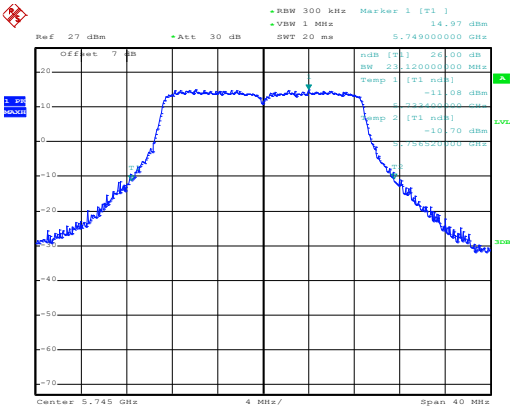
Middle channel



Date: 16.JUN.2016 11:19:14

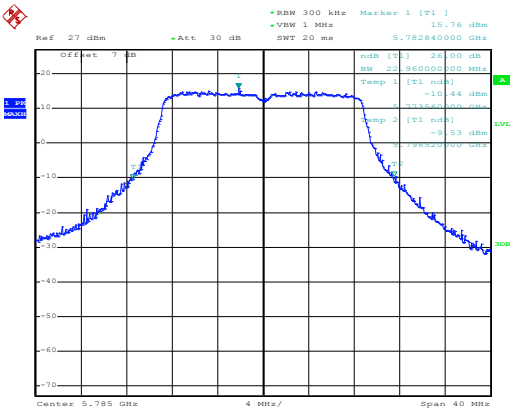
Highest channel

802.11n20



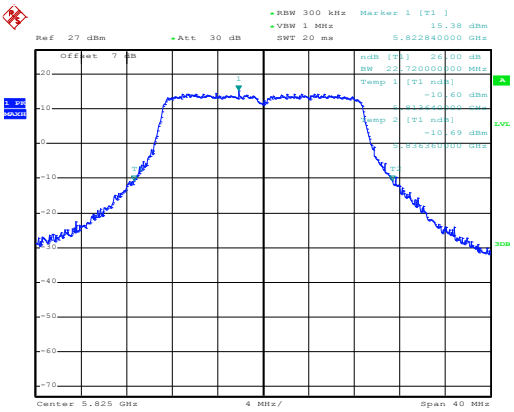
Date: 16.JUN.2016 11:34:37

Lowest channel



Date: 16.JUN.2016 11:21:36

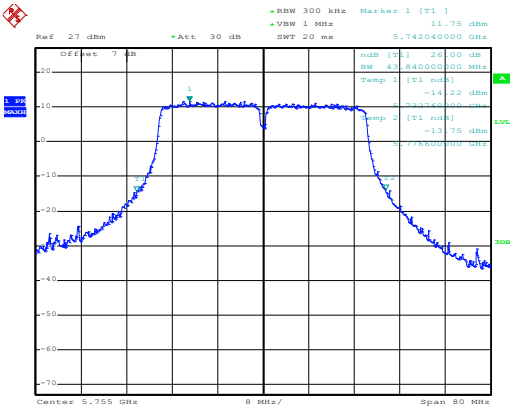
Middle channel



Date: 16.JUN.2016 11:20:58

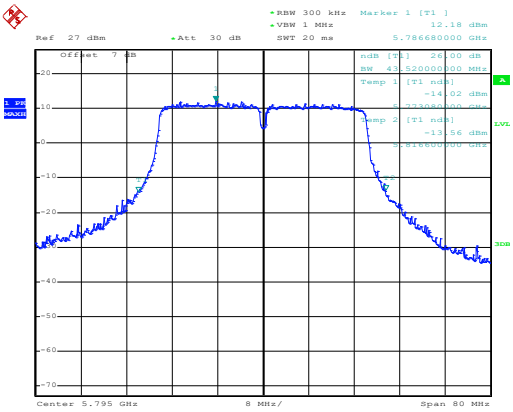
Highest channel

802.11n40



Date: 16.JUN.2016 11:42:46

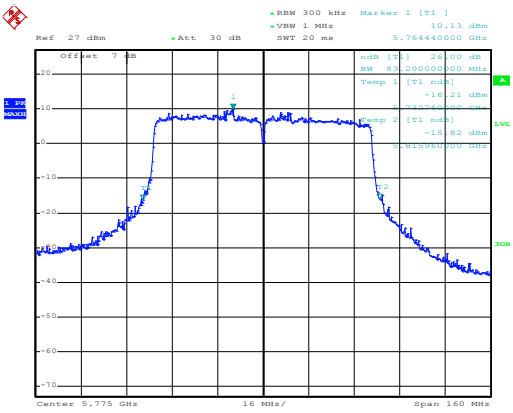
Lowest channel



Date: 16.JUN.2016 11:43:43

Highest channel

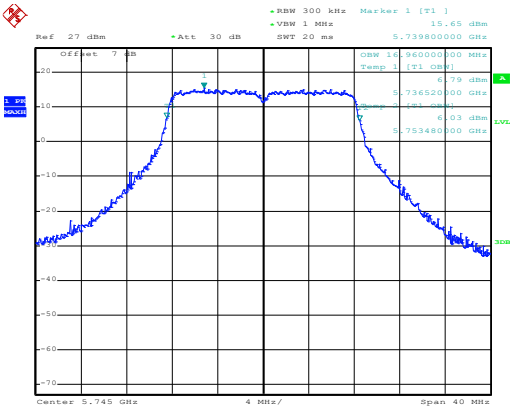
802.11ac



Date: 16.JUN.2016 11:49:30

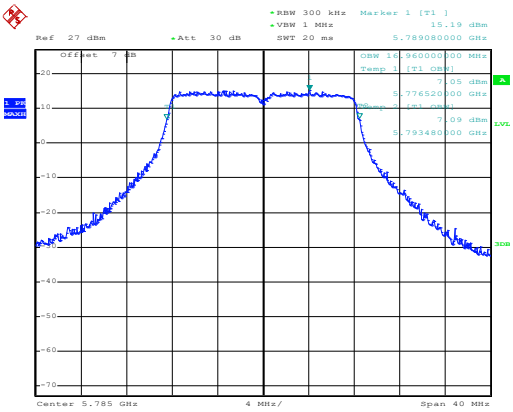
Middle channel

99% OBW - 802.11a



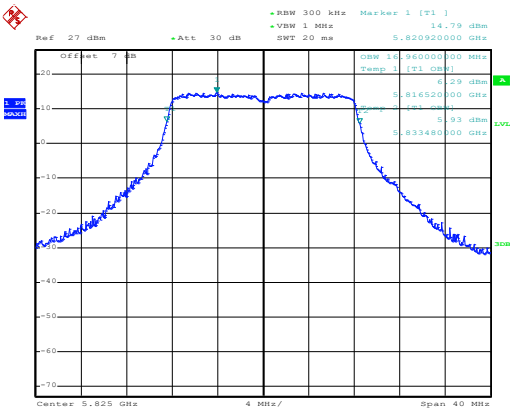
Date: 16.JUN.2016 11:18:01

Lowest channel



Date: 16.JUN.2016 11:18:32

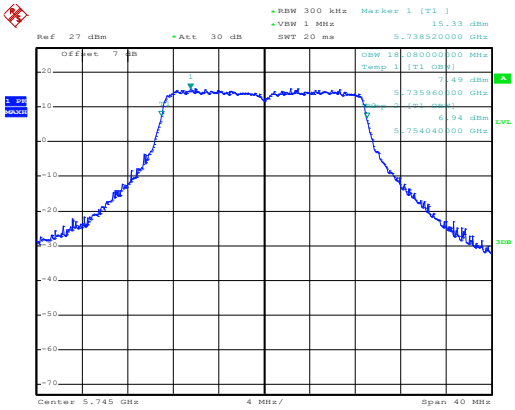
Middle channel



Date: 16.JUN.2016 11:19:26

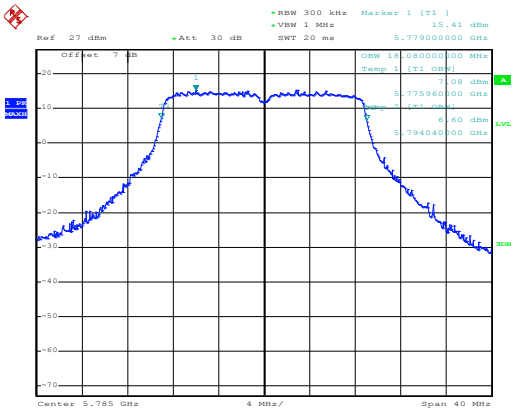
Highest channel

802.11n20



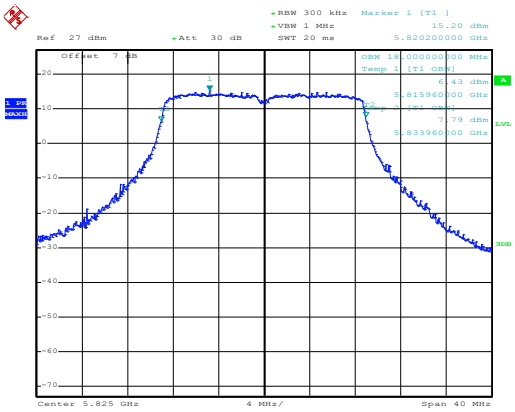
Date: 16.JUN.2016 11:34:29

Lowest channel



Date: 16.JUN.2016 11:22:22

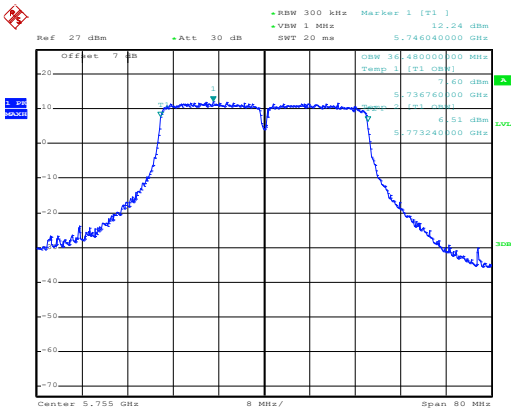
Middle channel



Date: 16.JUN.2016 11:20:48

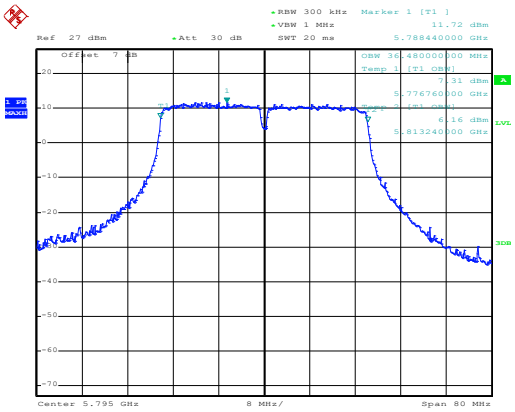
Highest channel

802.11n40



Date: 16.JUN.2016 11:42:36

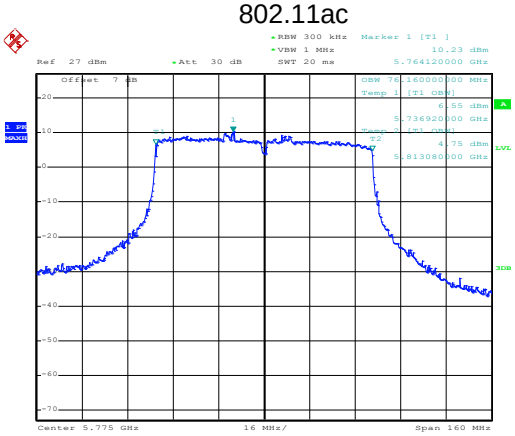
Lowest channel



Date: 16.JUN.2016 11:44:00

Highest channel

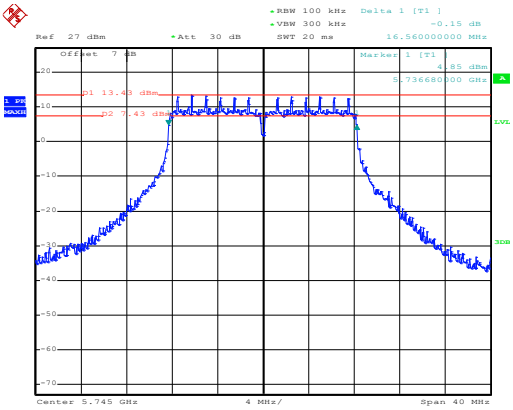
802.11ac



Date: 16.JUN.2016 11:49:18

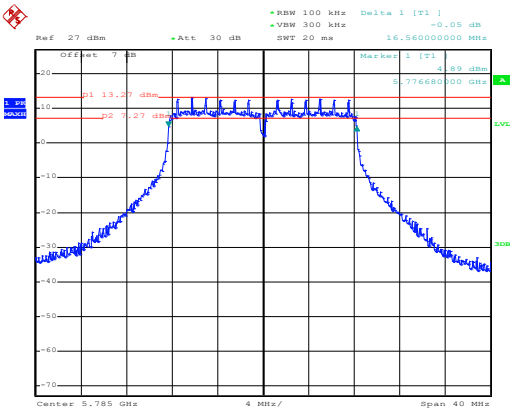
Middle channel

6 dB BW - 802.11a



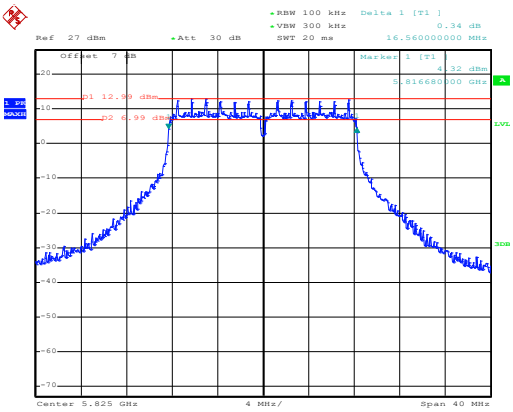
Date: 16.JUN.2016 17:18:25

Lowest channel



Date: 16.JUN.2016 17:19:49

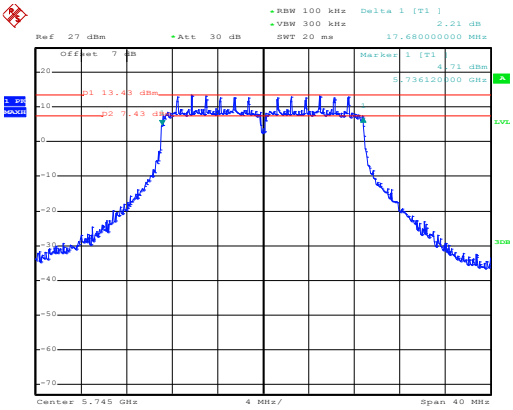
Middle channel



Date: 16.JUN.2016 17:21:18

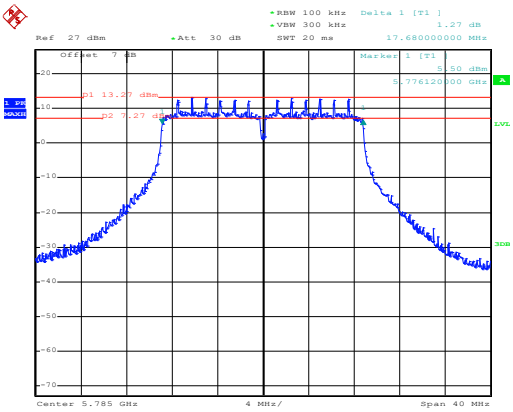
Highest channel

802.11n20



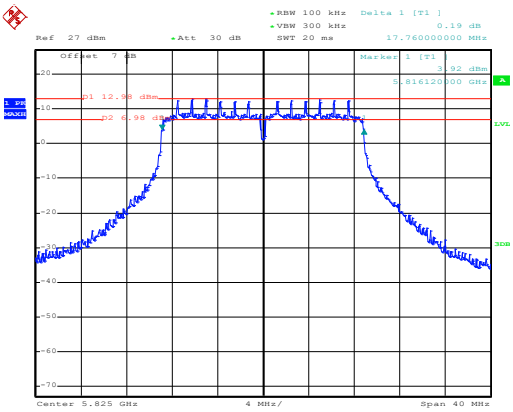
Date: 16.JUN.2016 17:25:09

Lowest channel



Date: 16.JUN.2016 17:23:56

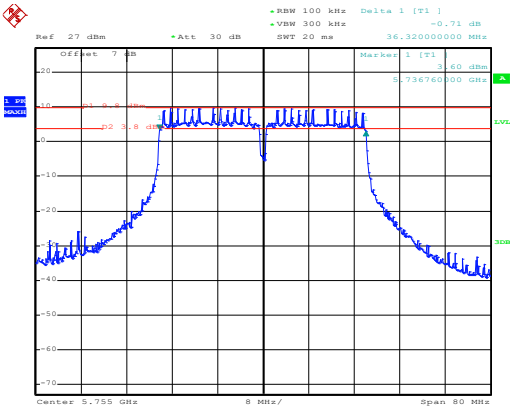
Middle channel



Date: 16.JUN.2016 17:22:39

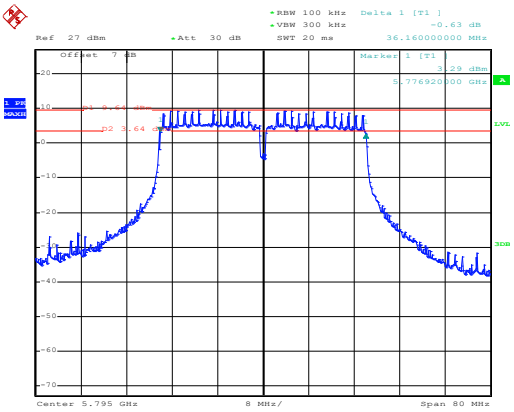
Highest channel

802.11n40



Date: 16.JUN.2016 17:43:44

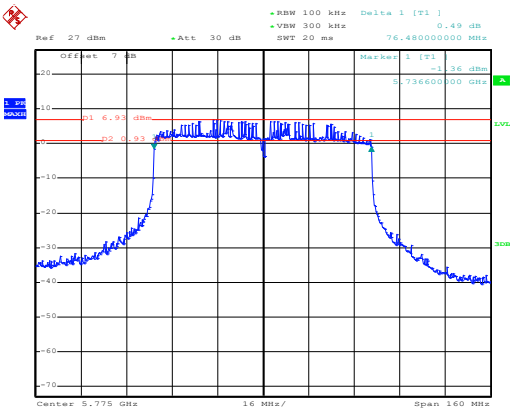
Lowest channel



Date: 16.JUN.2016 17:46:27

Highest channel

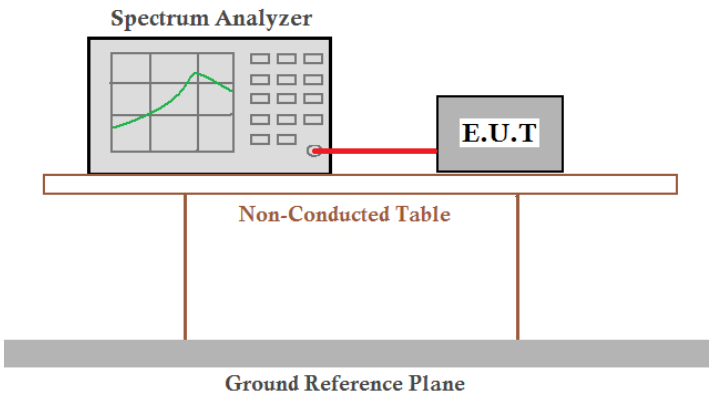
802.11ac



Date: 16.JUN.2016 17:03:52

Middle channel

6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) &(a) (3)
Test Method:	ANSI C63.10:2013, KDB 789033
Limit:	**Band 1:** 17 dBm/MHz (The maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.); **Band 4:** 30dBm/500kHz (The maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.)
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1

Mode	Test Channel	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	11.67	16.23	17.00	Pass
		TX1	11.31			
		TX2	11.38			
	Middle	TX0	11.62	16.30	17.00	Pass
		TX1	11.67			
		TX2	11.29			
	Highest	TX0	11.69	16.22	17.00	Pass
		TX1	11.50			
		TX2	11.13			
802.11n20	Lowest	TX0	11.45	16.03	17.00	Pass
		TX1	11.05			
		TX2	11.27			
	Middle	TX0	11.45	16.05	17.00	Pass
		TX1	11.34			
		TX2	11.02			
	Highest	TX0	11.52	16.06	17.00	Pass
		TX1	11.41			
		TX2	10.92			
802.11n40	Lowest	TX0	9.47	14.28	17.00	Pass
		TX1	9.80			
		TX2	9.23			
	Highest	TX0	9.36	14.17	17.00	Pass
		TX1	9.81			
		TX2	8.98			
802.11ac	Middle	TX0	6.81	11.68	17.00	Pass
		TX1	7.22			
		TX2	6.69			

Remark:
1. *Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.*
2. *The directional Gain of antenna is less than 6 dBi, so the limit of PSD is 17 dBm.*

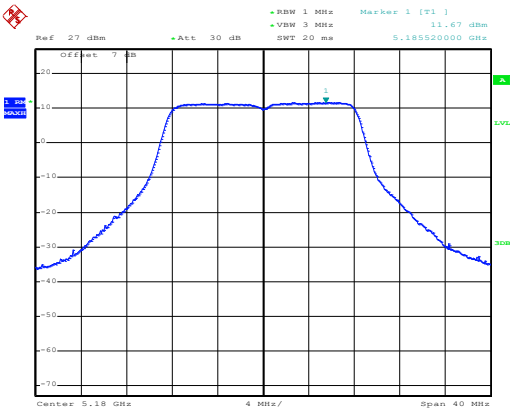
Band 4

Mode	Test Channel	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	13.58	18.67	30.00	Pass
		TX1	13.57			
		TX2	14.47			
	Middle	TX0	13.86	18.68	30.00	Pass
		TX1	13.71			
		TX2	14.14			
	Highest	TX0	13.52	18.98	30.00	Pass
		TX1	14.17			
		TX2	14.83			
802.11n20	Lowest	TX0	12.93	18.35	30.00	Pass
		TX1	13.43			
		TX2	14.28			
	Middle	TX0	12.79	18.33	30.00	Pass
		TX1	13.73			
		TX2	14.06			
	Highest	TX0	13.46	18.48	30.00	Pass
		TX1	13.30			
		TX2	14.30			
802.11n40	Lowest	TX0	9.61	15.12	30.00	Pass
		TX1	9.92			
		TX2	11.31			
	Highest	TX0	9.33	14.77	30.00	Pass
		TX1	10.10			
		TX2	10.49			
802.11ac	Middle	TX0	8.54	13.61	30.00	Pass
		TX1	8.70			
		TX2	9.25			

Remark:
1. *Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.*
2. *The directional Gain of antenna is less than 6 dBi, so the limit of PSD is 30 dBm.*

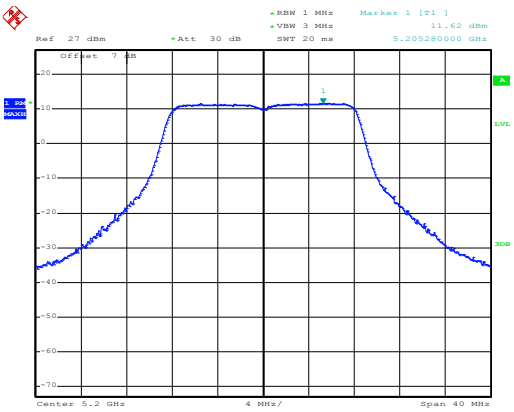
Test plot as follows:
Band 1:
TX0

Test mode:802.11a



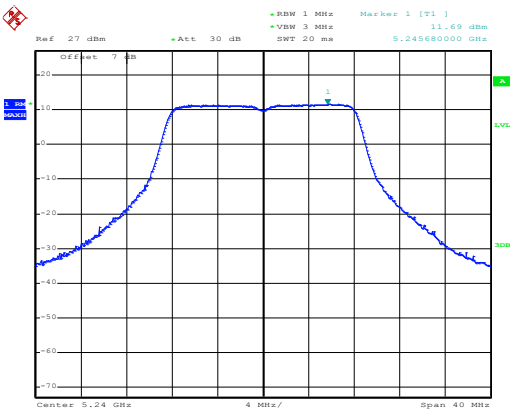
Date: 4.JUL.2016 08:53:01

Lowest channel



Date: 4.JUL.2016 08:54:20

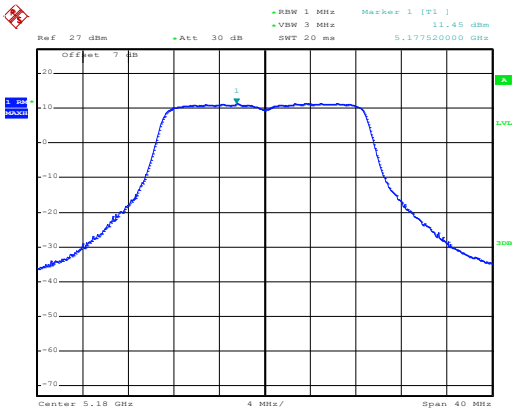
Middle channel



Date: 4.JUL.2016 08:55:07

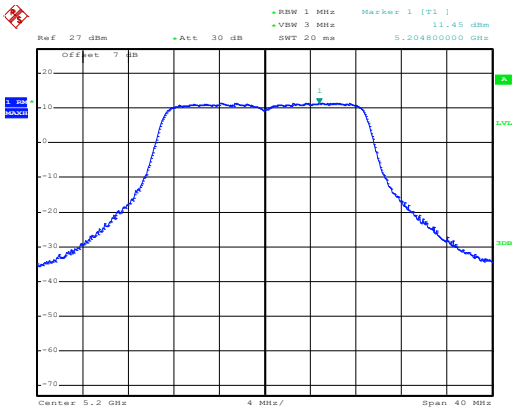
Highest channel

Test mode:802.11n20



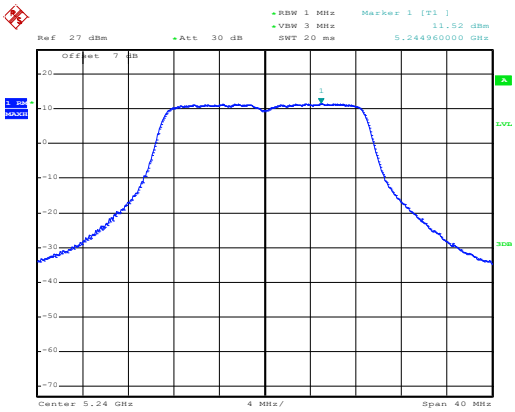
Date: 4.JUL.2016 09:04:02

Lowest channel



Date: 4.JUL.2016 08:57:35

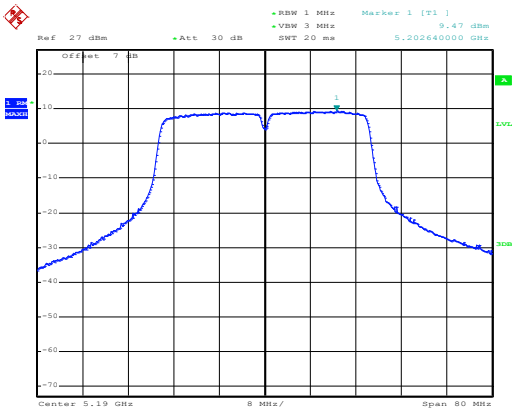
Middle channel



Date: 4.JUL.2016 08:56:59

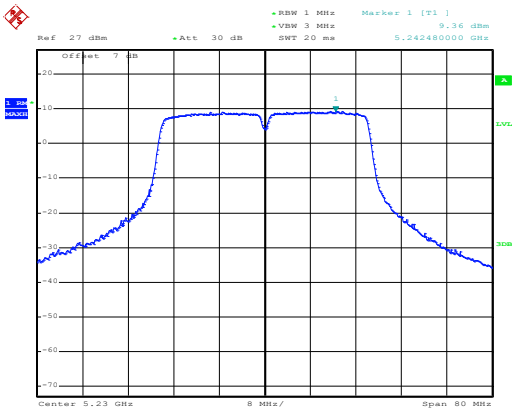
Highest channel

Test mode:802.11n40



Date: 4.JUL.2016 10:41:05

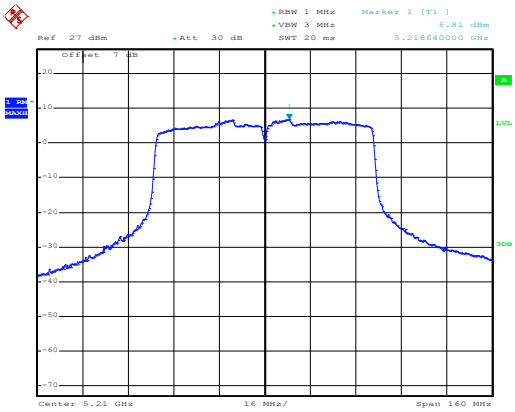
Lowest channel



Date: 4.JUL.2016 10:40:22

Highest channel

Test mode:802.11ac

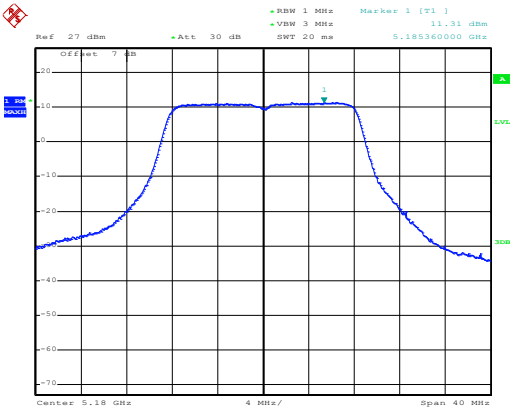


Date: 4.JUL.2016 10:39:14

Middle channel

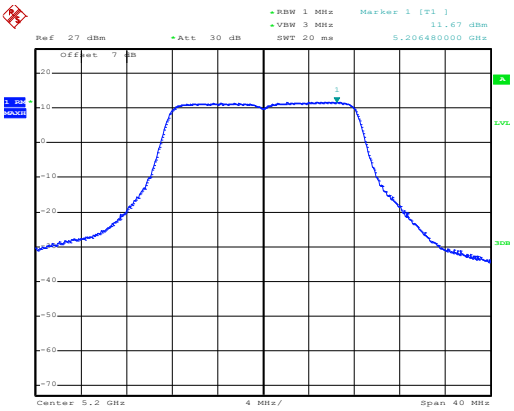
TX1

Test mode:802.11a



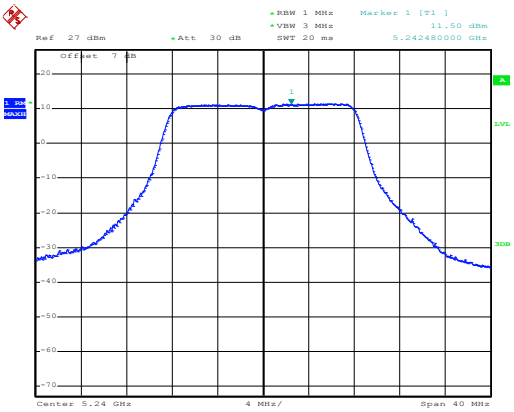
Date: 4.JUL.2016 09:26:36

Lowest channel



Date: 4.JUL.2016 09:28:22

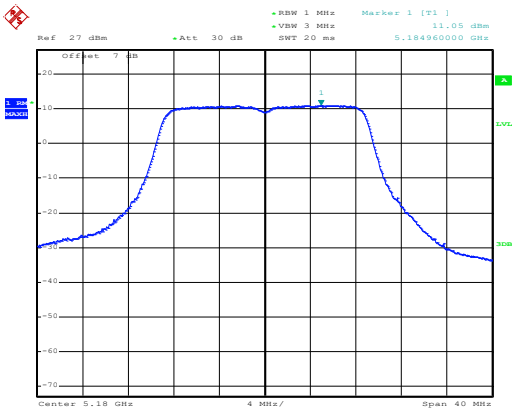
Middle channel



Date: 4.JUL.2016 09:29:01

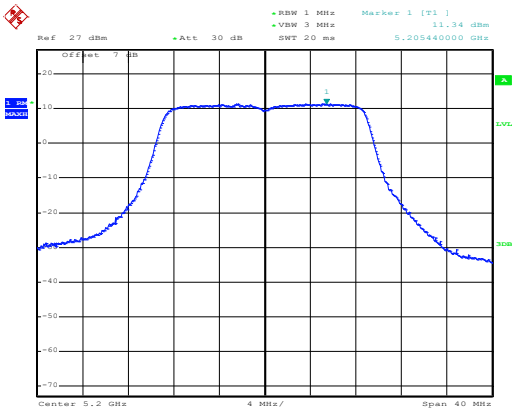
Highest channel

Test mode:802.11n20



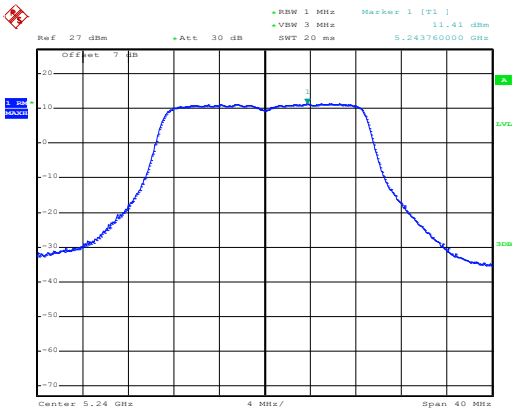
Date: 4.JUL.2016 09:32:28

Lowest channel



Date: 4.JUL.2016 09:31:06

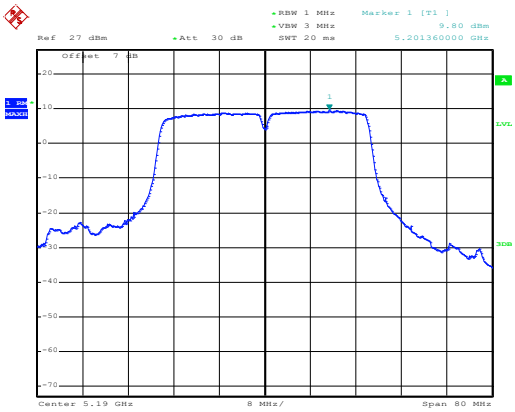
Middle channel



Date: 4.JUL.2016 09:30:02

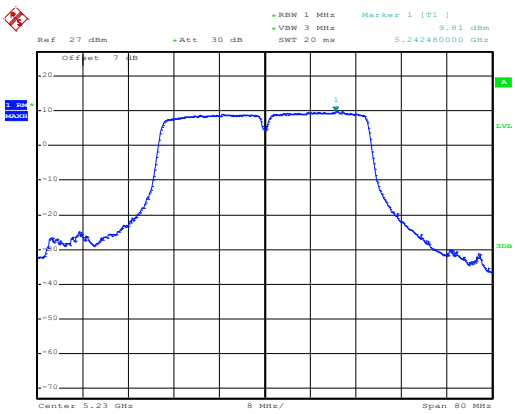
Highest channel

Test mode:802.11n40



Date: 4.JUL.2016 10:23:48

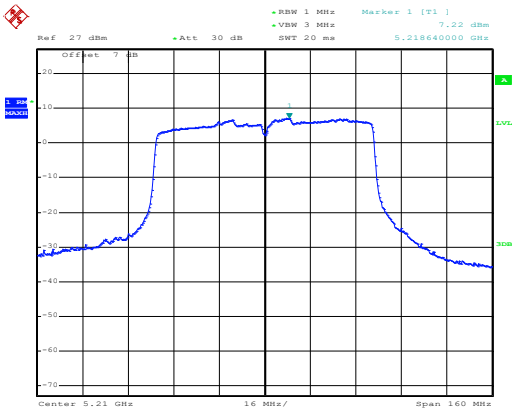
Lowest channel



Date: 4.JUL.2016 10:22:50

Highest channel

Test mode:802.11ac

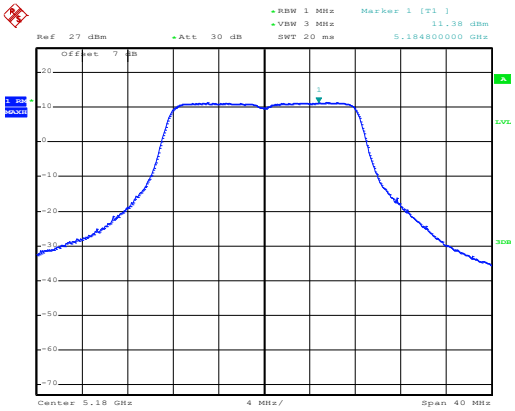


Date: 4.JUL.2016 10:21:33

Middle channel

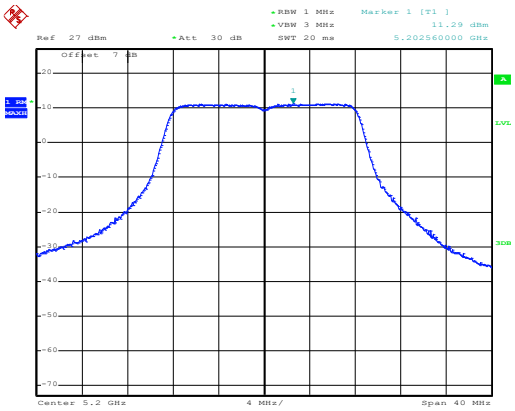
TX2

Test mode:802.11a



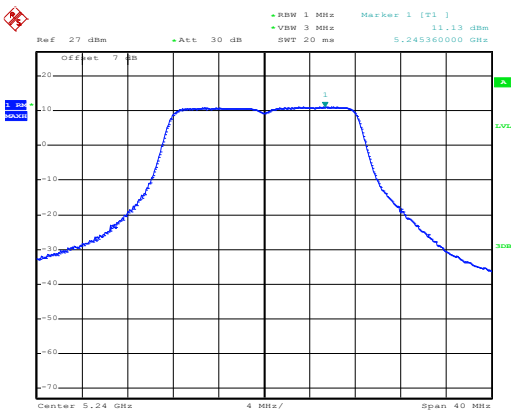
Date: 4.JUL.2016 09:49:50

Lowest channel



Date: 4.JUL.2016 09:49:13

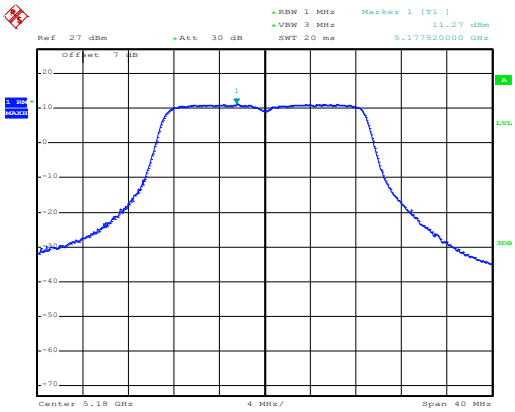
Middle channel



Date: 4.JUL.2016 09:48:38

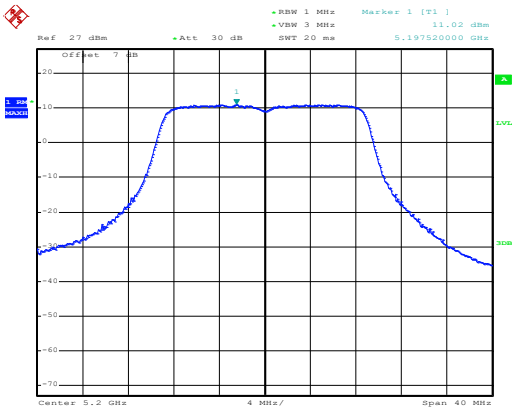
Highest channel

Test mode:802.11n20



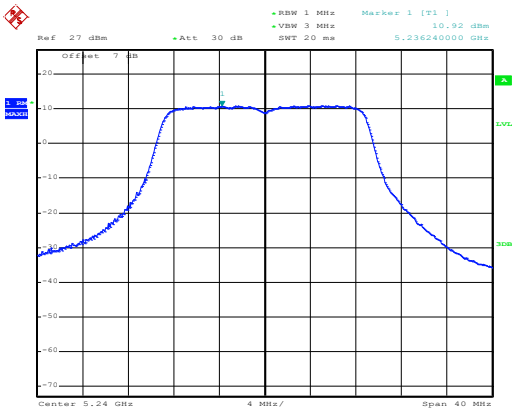
Date: 4.JUL.2016 09:45:21

Lowest channel



Date: 4.JUL.2016 09:46:06

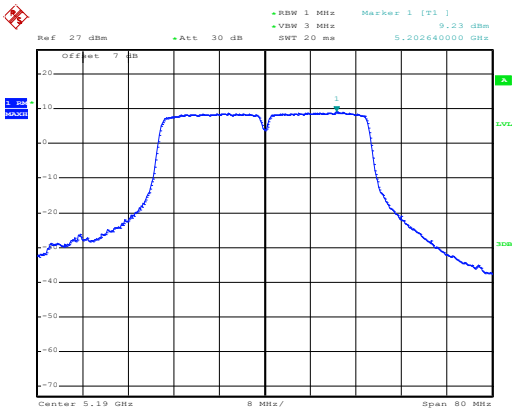
Middle channel



Date: 4.JUL.2016 09:47:23

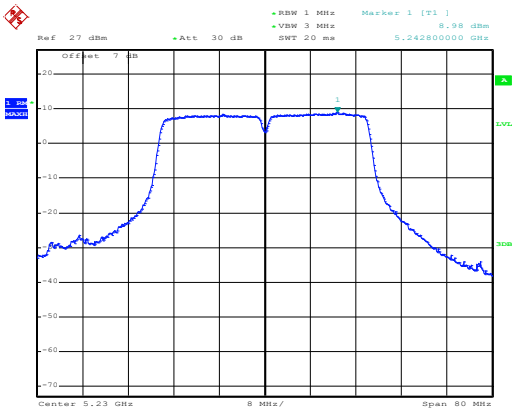
Highest channel

Test mode:802.11n40



Date: 4.JUL.2016 10:15:58

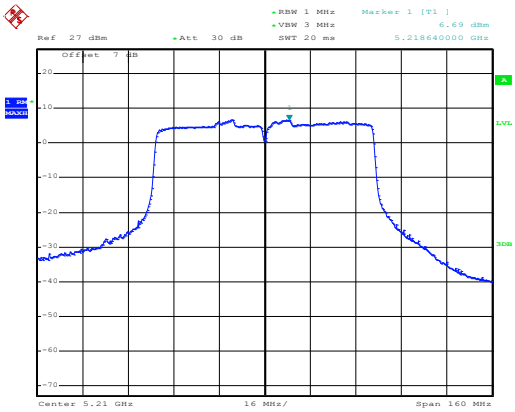
Lowest channel



Date: 4.JUL.2016 10:16:32

Highest channel

Test mode:802.11ac



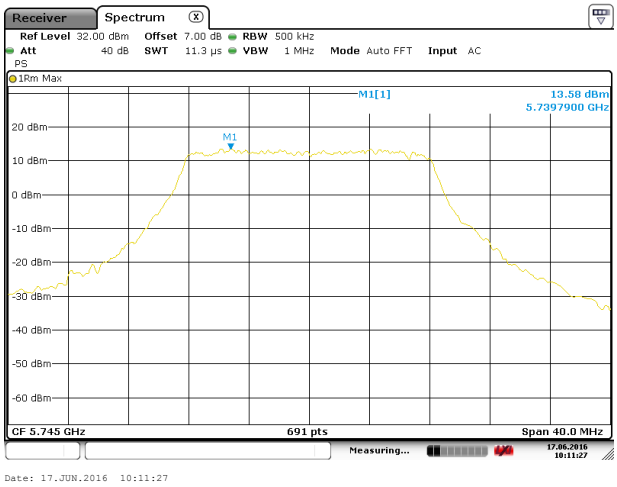
Date: 4.JUL.2016 10:10:58

Middle channel

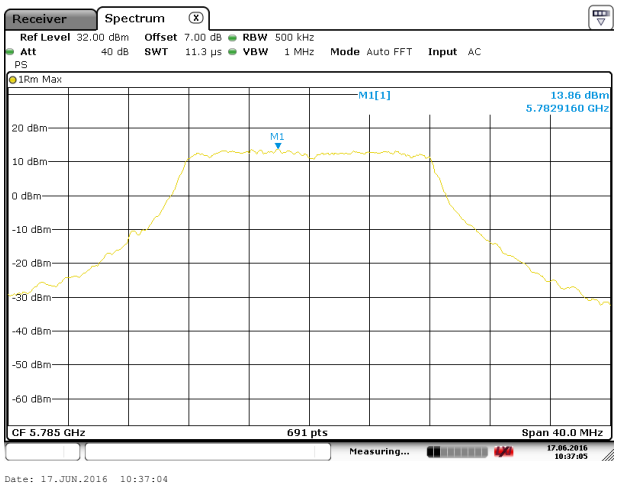
Band 4:

TX0

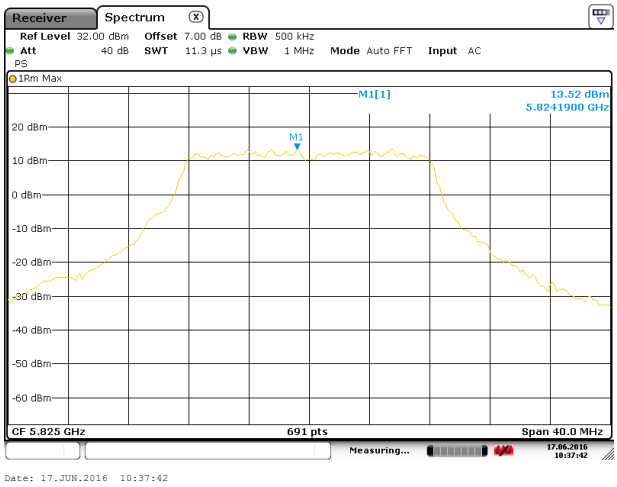
Test mode:802.11a



Lowest channel

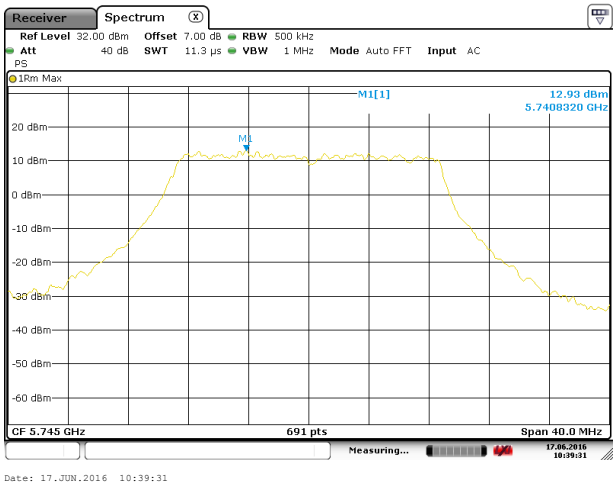


Middle channel

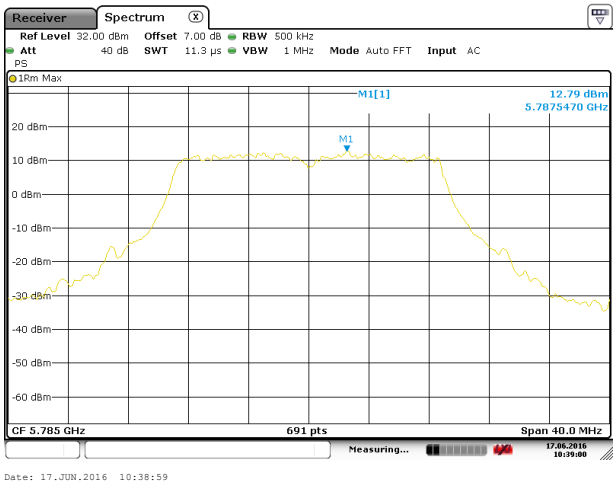


Highest channel

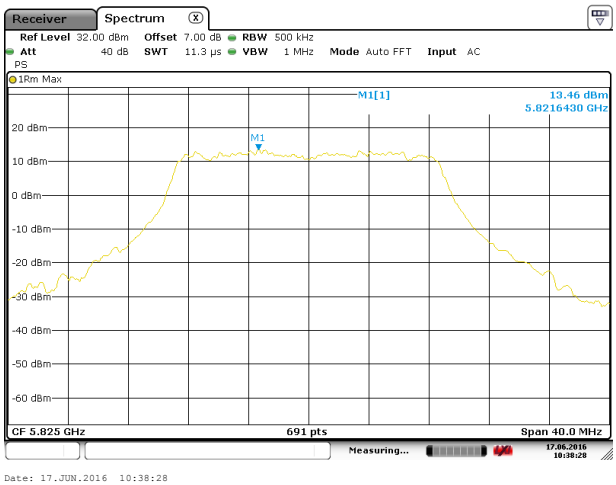
Test mode:802.11n20



Lowest channel

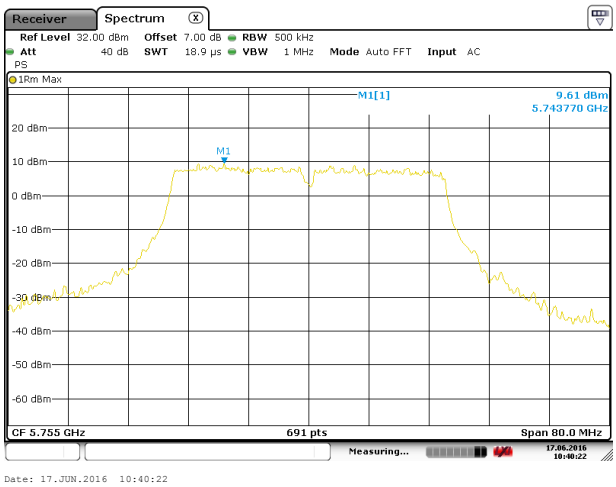


Middle channel

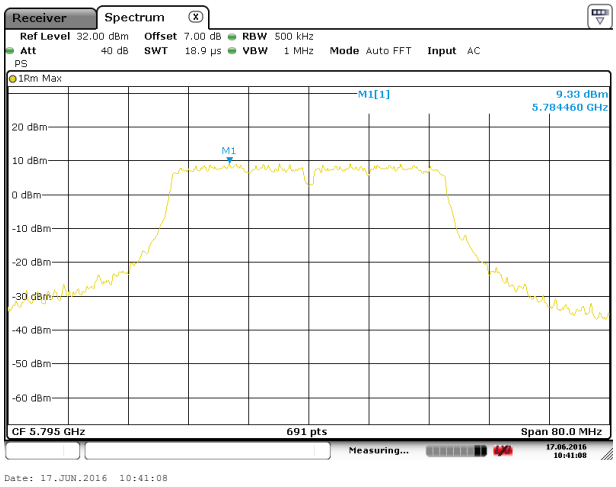


Highest channel

Test mode:802.11n40

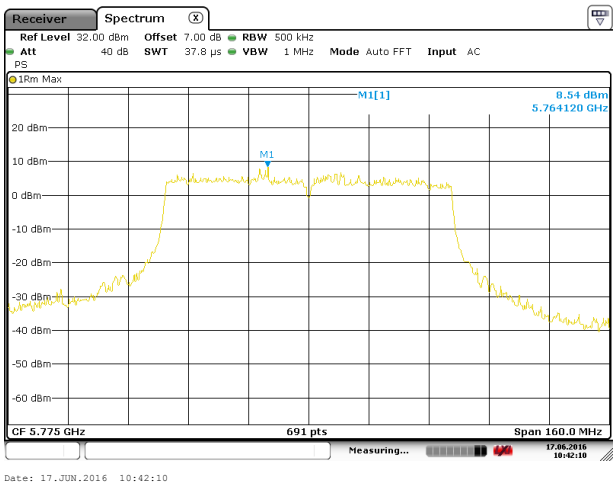


Lowest channel



Highest channel

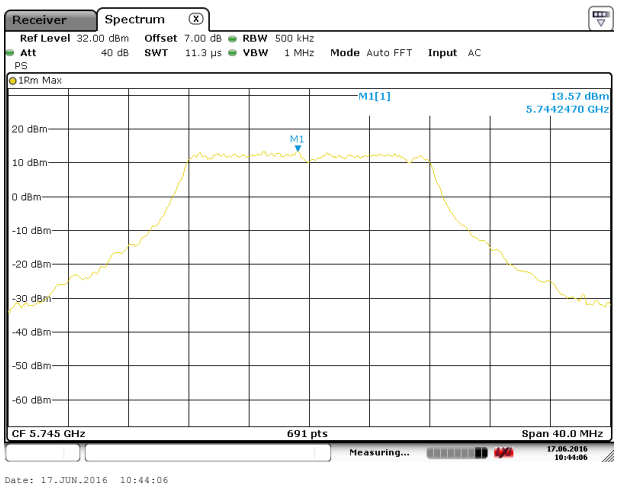
Test mode:802.11ac



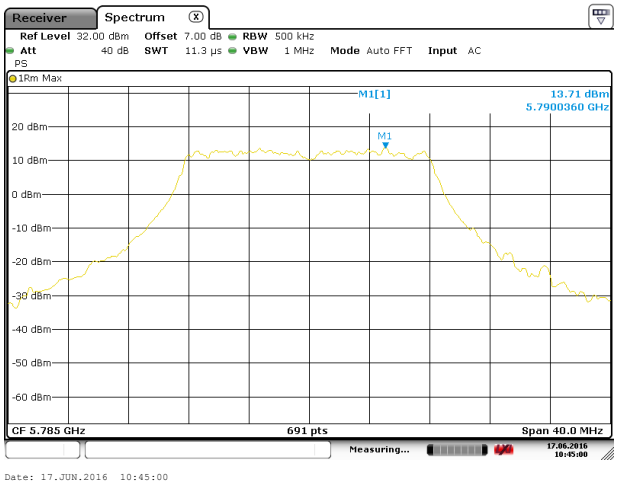
Middel channel

TX1

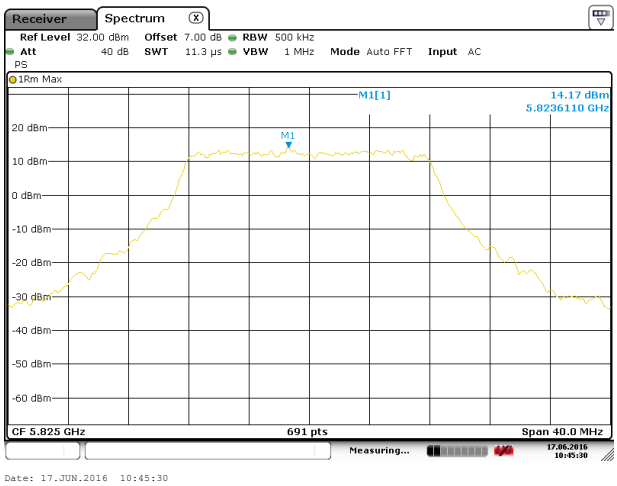
Test mode:802.11a



Lowest channel

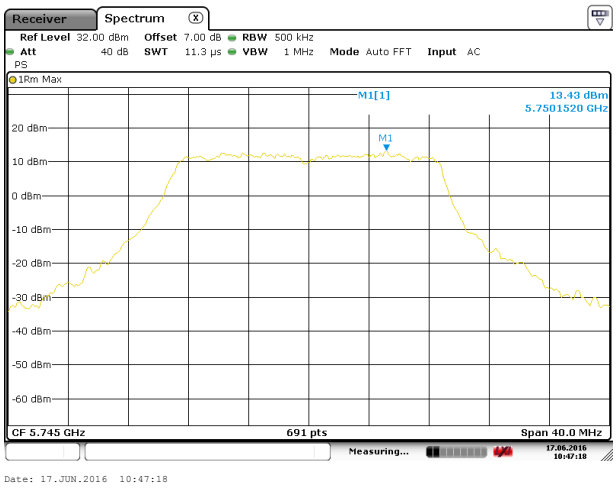


Middle channel

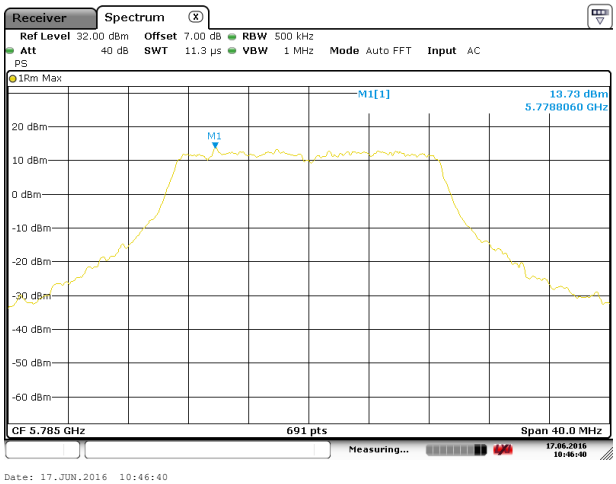


Highest channel

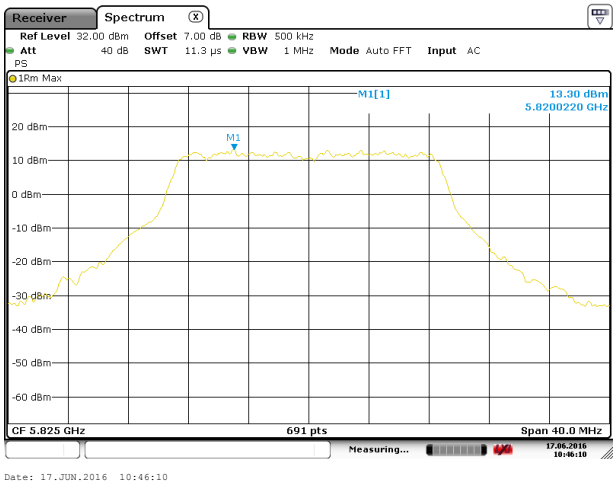
Test mode:802.11n20



Lowest channel

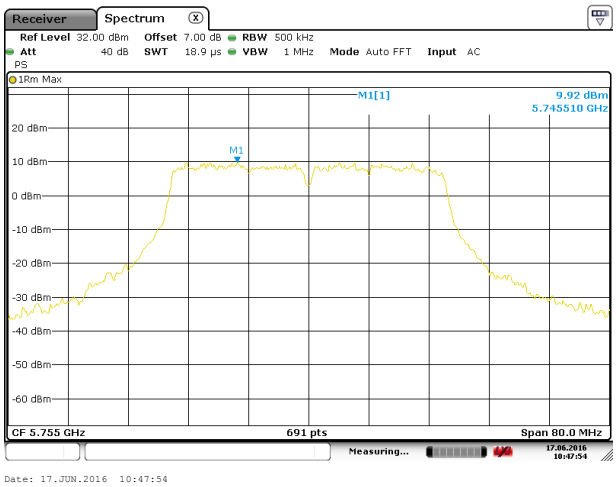


Middle channel

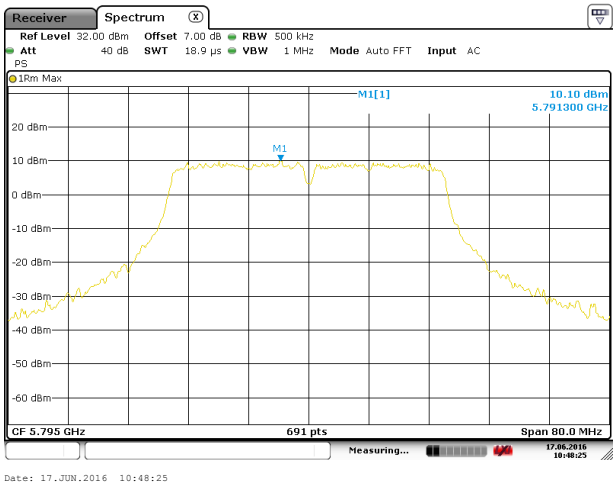


Highest channel

Test mode:802.11n40

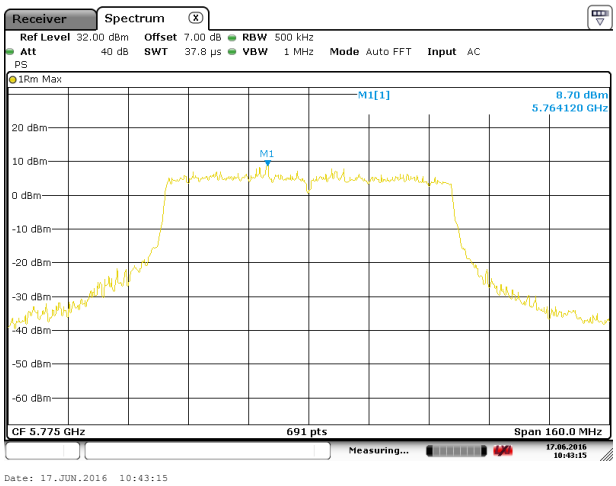


Lowest channel



Highest channel

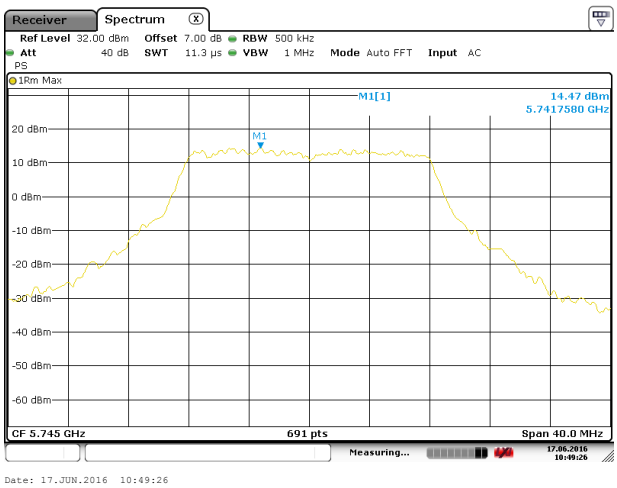
Test mode:802.11ac



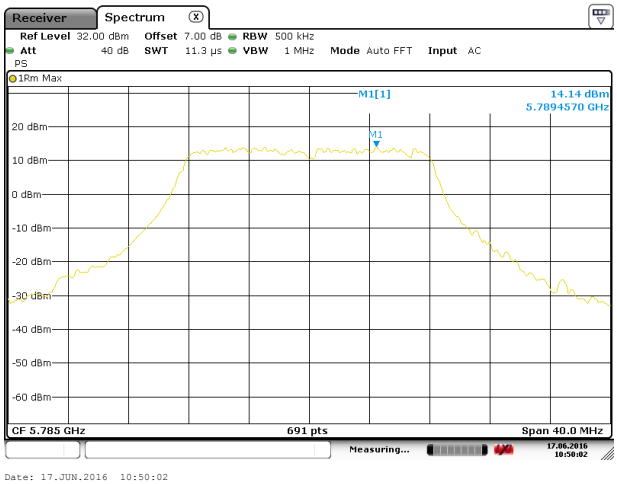
Middle channel

TX2

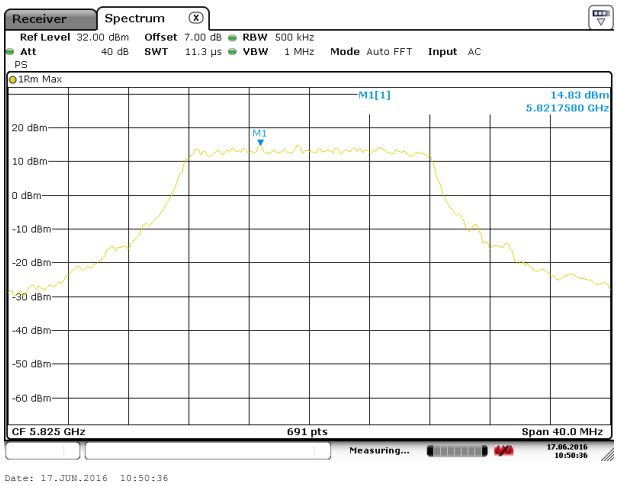
Test mode:802.11a



Lowest channel

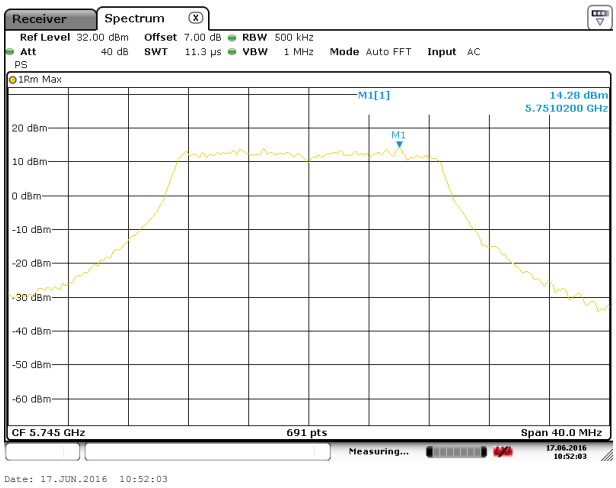


Middle channel

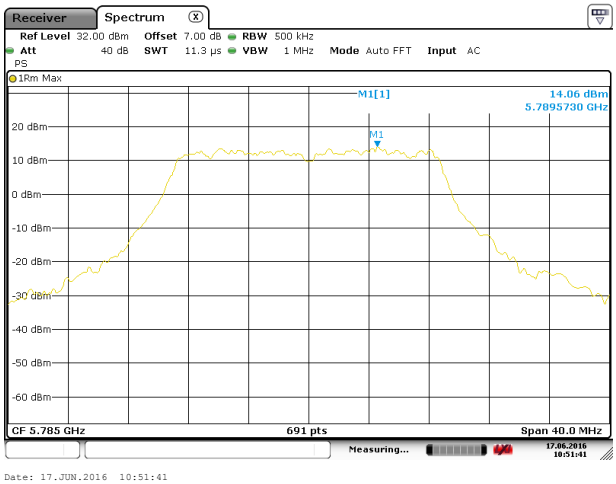


Highest channel

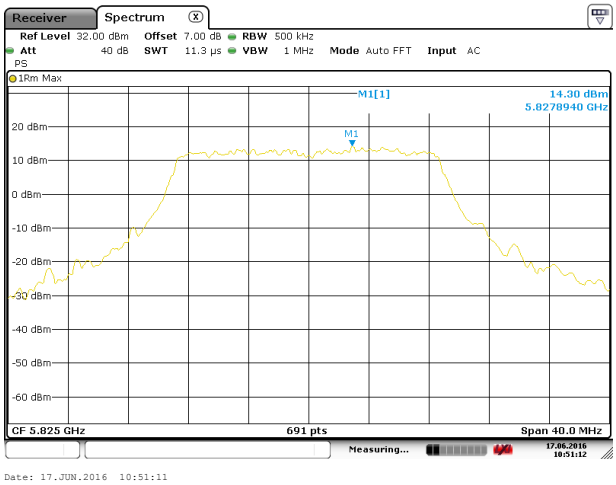
Test mode:802.11n20



Lowest channel

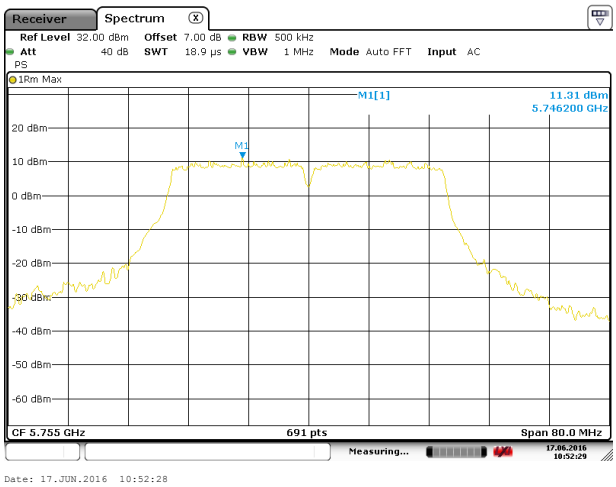


Middle channel

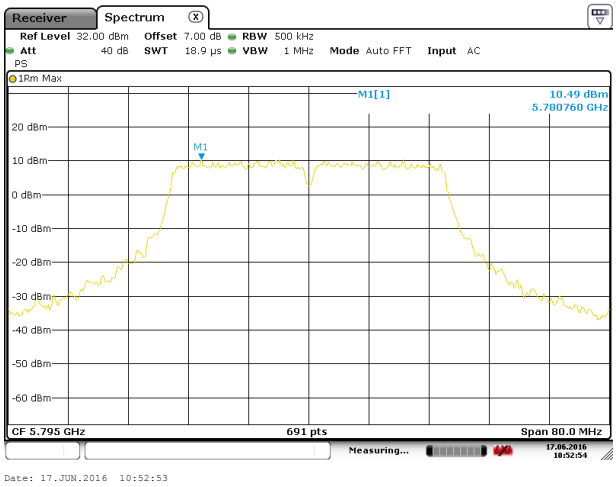


Highest channel

Test mode:802.11n40

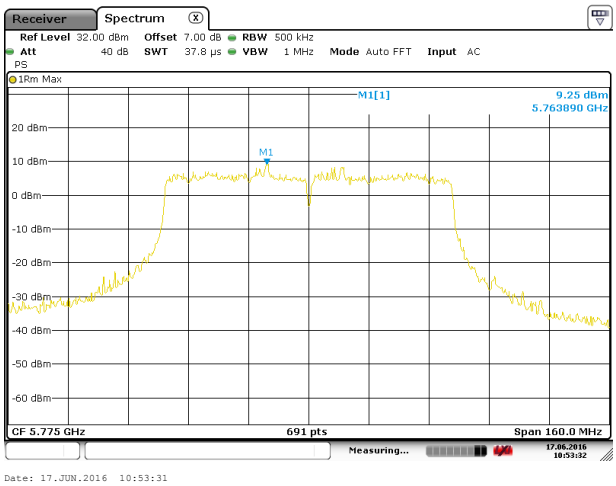


Lowest channel



Highest channel

Test mode:802.11ac



Middle channel

6.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 (b)
Test Method:	ANSI C63.10:2013, KDB 789033
Receiver setup:	

Detector	RBW	VBW	Remark
Quasi-peak	120kHz	300kHz	Quasi-peak Value
RMS	1MHz	3MHz	Average Value

Limit:

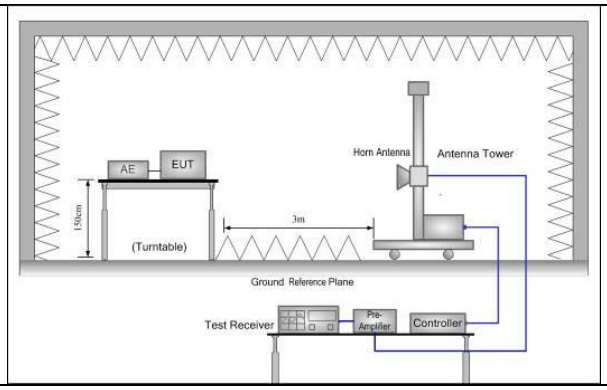
Band	Limit (dBuV/m @3m)	Remark
Band 1	68.20	Peak Value
	54.00	Average Value
Band 4	78.20	Peak Value
	54.00	Average Value

Remark:
1. Band 1 limit:
   E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m,for EIPR[dBm]=-27dBm.
2. Band 4 limit:
   E[dBμV/m] = EIRP[dBm] + 95.2=78.2 dBuV/m,for EIPR[dBm]=-17dBm.

Test Procedure:

1. The EUT was placed on the top of a rotating table 1.5 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test setup:



Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Band 1:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	55.03	36.23	10.96	40.06	62.16	68.20	-6.04	Horizontal
5150.00	55.17	36.23	10.96	40.06	62.30	68.20	-5.90	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.06	36.23	10.96	40.06	39.19	54.00	-14.81	Horizontal
5150.00	31.47	36.23	10.96	40.06	38.60	54.00	-15.40	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.58	35.37	11.19	40.18	52.96	68.20	-15.24	Horizontal
5350.00	50.16	35.37	11.19	40.18	56.54	68.20	-11.66	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	37.15	35.37	11.19	40.18	43.53	54.00	-10.47	Horizontal
5350.00	38.38	35.37	11.19	40.18	44.76	54.00	-9.24	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	54.58	36.23	10.96	40.06	61.71	68.20	-6.49	Horizontal
5150.00	55.36	36.23	10.96	40.06	62.49	68.20	-5.71	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.71	36.23	10.96	40.06	39.84	54.00	-14.16	Horizontal
5150.00	31.54	36.23	10.96	40.06	38.67	54.00	-15.33	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	47.30	35.37	11.19	40.18	53.68	68.20	-14.52	Horizontal
5350.00	51.24	35.37	11.19	40.18	57.62	68.20	-10.58	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	36.69	35.37	11.19	40.18	43.07	54.00	-10.93	Horizontal
5350.00	37.77	35.37	11.19	40.18	44.15	54.00	-9.85	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	55.11	36.23	10.96	40.06	62.24	68.20	-5.96	Horizontal
5150.00	56.03	36.23	10.96	40.06	63.16	68.20	-5.04	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.14	36.23	10.96	40.06	39.27	54.00	-14.73	Horizontal
5150.00	32.82	36.23	10.96	40.06	39.95	54.00	-14.05	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.63	35.37	11.19	40.18	53.01	68.20	-15.19	Horizontal
5350.00	50.87	35.37	11.19	40.18	57.25	68.20	-10.95	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.58	35.37	11.19	40.18	41.96	54.00	-12.04	Horizontal
5350.00	36.42	35.37	11.19	40.18	42.80	54.00	-11.20	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	55.46	36.23	10.96	40.06	62.59	68.20	-5.61	Horizontal
5150.00	55.82	36.23	10.96	40.06	62.95	68.20	-5.25	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	31.36	36.23	10.96	40.06	38.49	54.00	-15.51	Horizontal
5150.00	32.42	36.23	10.96	40.06	39.55	54.00	-14.45	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.36	35.37	11.19	40.18	52.74	68.20	-15.46	Horizontal
5350.00	50.89	35.37	11.19	40.18	57.27	68.20	-10.93	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.58	35.37	11.19	40.18	40.96	54.00	-13.04	Horizontal
5350.00	35.76	35.37	11.19	40.18	42.14	54.00	-11.86	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Band 4:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.68	34.65	11.62	40.54	51.41	78.20	-26.79	Horizontal
5725.00	46.09	34.65	11.62	40.54	51.82	78.20	-26.38	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.86	34.65	11.62	40.54	38.59	54.00	-15.41	Horizontal
5725.00	37.12	34.65	11.62	40.54	42.85	54.00	-11.15	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	44.65	34.63	11.75	40.69	50.34	78.20	-27.86	Horizontal
5850.00	44.80	34.63	11.75	40.69	50.49	78.20	-27.71	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.59	34.63	11.75	40.69	38.28	54.00	-15.72	Horizontal
5850.00	32.64	34.63	11.75	40.69	38.33	54.00	-15.67	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.31	34.65	11.62	40.54	51.04	78.20	-27.16	Horizontal
5725.00	45.85	34.65	11.62	40.54	51.58	78.20	-26.62	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.71	34.65	11.62	40.54	38.44	54.00	-15.56	Horizontal
5725.00	36.69	34.65	11.62	40.54	42.42	54.00	-11.58	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	45.01	34.63	11.75	40.69	50.70	78.20	-27.50	Horizontal
5850.00	44.25	34.63	11.75	40.69	49.94	78.20	-28.26	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.25	34.63	11.75	40.69	37.94	54.00	-16.06	Horizontal
5850.00	31.86	34.63	11.75	40.69	37.55	54.00	-16.45	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	46.03	34.65	11.62	40.54	51.76	78.20	-26.44	Horizontal
5725.00	44.15	34.65	11.62	40.54	49.88	78.20	-28.32	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.56	34.65	11.62	40.54	38.29	54.00	-15.71	Horizontal
5725.00	35.24	34.65	11.62	40.54	40.97	54.00	-13.03	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	46.35	34.63	11.75	40.69	52.04	78.20	-26.16	Horizontal
5850.00	44.82	34.63	11.75	40.69	50.51	78.20	-27.69	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.12	34.63	11.75	40.69	37.81	54.00	-16.19	Horizontal
5850.00	32.03	34.63	11.75	40.69	37.72	54.00	-16.28	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.53	34.65	11.62	40.54	51.26	78.20	-26.94	Horizontal
5725.00	43.37	34.65	11.62	40.54	49.10	78.20	-29.10	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.25	34.65	11.62	40.54	37.98	54.00	-16.02	Horizontal
5725.00	34.48	34.65	11.62	40.54	40.21	54.00	-13.79	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	46.36	34.63	11.75	40.69	52.05	78.20	-26.15	Horizontal
5850.00	45.02	34.63	11.75	40.69	50.71	78.20	-27.49	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	31.48	34.63	11.75	40.69	37.17	54.00	-16.83	Horizontal
5850.00	31.27	34.63	11.75	40.69	36.96	54.00	-17.04	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Antenna 1
Band 1:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	54.25	36.23	10.96	40.06	61.38	68.20	-6.82	Horizontal
5150.00	55.23	36.23	10.96	40.06	62.36	68.20	-5.84	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	33.14	36.23	10.96	40.06	40.27	54.00	-13.73	Horizontal
5150.00	32.27	36.23	10.96	40.06	39.40	54.00	-14.60	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.36	35.37	11.19	40.18	52.74	68.20	-15.46	Horizontal
5350.00	50.01	35.37	11.19	40.18	56.39	68.20	-11.81	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	37.26	35.37	11.19	40.18	43.64	54.00	-10.36	Horizontal
5350.00	37.79	35.37	11.19	40.18	44.17	54.00	-9.83	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	55.00	36.23	10.96	40.06	62.13	68.20	-6.07	Horizontal
5150.00	55.13	36.23	10.96	40.06	62.26	68.20	-5.94	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.25	36.23	10.96	40.06	39.38	54.00	-14.62	Horizontal
5150.00	31.64	36.23	10.96	40.06	38.77	54.00	-15.23	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	47.23	35.37	11.19	40.18	53.61	68.20	-14.59	Horizontal
5350.00	50.71	35.37	11.19	40.18	57.09	68.20	-11.11	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	36.59	35.37	11.19	40.18	42.97	54.00	-11.03	Horizontal
5350.00	37.81	35.37	11.19	40.18	44.19	54.00	-9.81	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	55.13	36.23	10.96	40.06	62.26	68.20	-5.94	Horizontal
5150.00	56.21	36.23	10.96	40.06	63.34	68.20	-4.86	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.36	36.23	10.96	40.06	39.49	54.00	-14.51	Horizontal
5150.00	32.71	36.23	10.96	40.06	39.84	54.00	-14.16	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.69	35.37	11.19	40.18	53.07	68.20	-15.13	Horizontal
5350.00	50.21	35.37	11.19	40.18	56.59	68.20	-11.61	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.37	35.37	11.19	40.18	41.75	54.00	-12.25	Horizontal
5350.00	36.42	35.37	11.19	40.18	42.80	54.00	-11.20	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	55.63	36.23	10.96	40.06	62.76	68.20	-5.44	Horizontal
5150.00	55.71	36.23	10.96	40.06	62.84	68.20	-5.36	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	31.52	36.23	10.96	40.06	38.65	54.00	-15.35	Horizontal
5150.00	32.47	36.23	10.96	40.06	39.60	54.00	-14.40	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.36	35.37	11.19	40.18	52.74	68.20	-15.46	Horizontal
5350.00	50.42	35.37	11.19	40.18	56.80	68.20	-11.40	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	34.23	35.37	11.19	40.18	40.61	54.00	-13.39	Horizontal
5350.00	35.12	35.37	11.19	40.18	41.50	54.00	-12.50	Vertical

Remark:
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Band 4:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.68	34.65	11.62	40.54	51.41	78.20	-26.79	Horizontal
5725.00	46.63	34.65	11.62	40.54	52.36	78.20	-25.84	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.75	34.65	11.62	40.54	38.48	54.00	-15.52	Horizontal
5725.00	36.61	34.65	11.62	40.54	42.34	54.00	-11.66	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	45.26	34.63	11.75	40.69	50.95	78.20	-27.25	Horizontal
5850.00	42.23	34.63	11.75	40.69	47.92	78.20	-30.28	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.58	34.63	11.75	40.69	38.27	54.00	-15.73	Horizontal
5850.00	32.16	34.63	11.75	40.69	37.85	54.00	-16.15	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.33	34.65	11.62	40.54	51.06	78.20	-27.14	Horizontal
5725.00	45.91	34.65	11.62	40.54	51.64	78.20	-26.56	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.69	34.65	11.62	40.54	38.42	54.00	-15.58	Horizontal
5725.00	36.71	34.65	11.62	40.54	42.44	54.00	-11.56	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	45.52	34.63	11.75	40.69	51.21	78.20	-26.99	Horizontal
5850.00	45.03	34.63	11.75	40.69	50.72	78.20	-27.48	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.31	34.63	11.75	40.69	38.00	54.00	-16.00	Horizontal
5850.00	31.69	34.63	11.75	40.69	37.38	54.00	-16.62	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	46.25	34.65	11.62	40.54	51.98	78.20	-26.22	Horizontal
5725.00	45.03	34.65	11.62	40.54	50.76	78.20	-27.44	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.67	34.65	11.62	40.54	38.40	54.00	-15.60	Horizontal
5725.00	35.31	34.65	11.62	40.54	41.04	54.00	-12.96	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	46.42	34.63	11.75	40.69	52.11	78.20	-26.09	Horizontal
5850.00	45.03	34.63	11.75	40.69	50.72	78.20	-27.48	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.25	34.63	11.75	40.69	37.94	54.00	-16.06	Horizontal
5850.00	32.14	34.63	11.75	40.69	37.83	54.00	-16.17	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

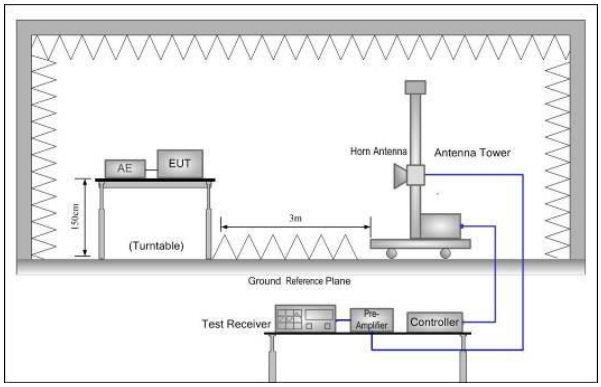
802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	46.33	34.65	11.62	40.54	52.06	78.20	-26.14	Horizontal
5725.00	45.01	34.65	11.62	40.54	50.74	78.20	-27.46	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.58	34.65	11.62	40.54	38.31	54.00	-15.69	Horizontal
5725.00	34.52	34.65	11.62	40.54	40.25	54.00	-13.75	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	46.58	34.63	11.75	40.69	52.27	78.20	-25.93	Horizontal
5850.00	45.69	34.63	11.75	40.69	51.38	78.20	-26.82	Vertical
802.11ac-HT80								
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	31.47	34.63	11.75	40.69	37.16	54.00	-16.84	Horizontal
5850.00	31.32	34.63	11.75	40.69	37.01	54.00	-16.99	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.7 Spurious Emission

6.7.1 Restricted Band

Test Requirement:	FCC Part15 E Section 15.407(b)				
Test Method:	ANSI C63.10: 2013				
TestFrequencyRange:	Band 1: 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz Band 4: 5.35 GHz to 5.46 GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency	Limit (dBuV/m @3m)		Remark	
	Above 1GHz	74.00		Peak Value	
		54.00		Average Value	
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.				
Test setup:					
Test Instruments:	Refer to section 5.8 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

Band 1:
802.11a

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	43.25	34.50	10.22	40.67	47.30	74.00	-26.70	Horizontal
4500.00	42.27	34.50	10.22	40.67	46.32	74.00	-27.68	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	32.69	34.50	10.22	40.67	36.74	54.00	-17.26	Horizontal
4500.00	32.01	34.50	10.22	40.67	36.06	54.00	-17.94	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	42.12	34.90	11.32	40.23	48.11	74.00	-25.89	Horizontal
5460.00	41.78	34.90	11.32	40.23	47.77	74.00	-26.23	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	32.23	34.90	11.32	40.23	38.22	54.00	-15.78	Horizontal
5460.00	32.51	34.90	11.32	40.23	38.50	54.00	-15.50	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	42.27	34.50	10.22	40.67	46.32	74.00	-27.68	Horizontal
4500.00	42.12	34.50	10.22	40.67	46.17	74.00	-27.83	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	31.03	34.50	10.22	40.67	35.08	54.00	-18.92	Horizontal
4500.00	32.59	34.50	10.22	40.67	36.64	54.00	-17.36	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	41.75	34.90	11.32	40.23	47.74	74.00	-26.26	Horizontal
5460.00	42.36	34.90	11.32	40.23	48.35	74.00	-25.65	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	32.23	34.90	11.32	40.23	38.22	54.00	-15.78	Horizontal
5460.00	32.58	34.90	11.32	40.23	38.57	54.00	-15.43	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	42.25	34.50	10.22	40.67	46.30	74.00	-27.70	Horizontal
4500.00	41.63	34.50	10.22	40.67	45.68	74.00	-28.32	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	32.62	34.50	10.22	40.67	36.67	54.00	-17.33	Horizontal
4500.00	31.54	34.50	10.22	40.67	35.59	54.00	-18.41	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	41.89	34.90	11.32	40.23	47.88	74.00	-26.12	Horizontal
5460.00	42.25	34.90	11.32	40.23	48.24	74.00	-25.76	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	31.25	34.90	11.32	40.23	37.24	54.00	-16.76	Horizontal
5460.00	32.86	34.90	11.32	40.23	38.85	54.00	-15.15	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11ac-HT80

Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	41.73	34.50	10.22	40.67	45.78	74.00	-28.22	Horizontal
4500.00	42.62	34.50	10.22	40.67	46.67	74.00	-27.33	Vertical
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	32.02	34.50	10.22	40.67	36.07	54.00	-17.93	Horizontal
4500.00	32.45	34.50	10.22	40.67	36.50	54.00	-17.50	Vertical
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	41.75	34.90	11.32	40.23	47.74	74.00	-26.26	Horizontal
5460.00	42.26	34.90	11.32	40.23	48.25	74.00	-25.75	Vertical
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	32.77	34.90	11.32	40.23	38.76	54.00	-15.24	Horizontal
5460.00	31.63	34.90	11.32	40.23	37.62	54.00	-16.38	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Band 4:
802.11a

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	43.17	35.37	11.19	40.18	49.55	74.00	-24.45	Horizontal
5350.00	42.01	35.37	11.19	40.18	48.39	74.00	-25.61	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.58	35.37	11.19	40.18	38.96	54.00	-15.04	Horizontal
5350.00	31.25	35.37	11.19	40.18	37.63	54.00	-16.37	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	42.58	34.90	11.32	40.23	48.57	74.00	-25.43	Horizontal
5460.00	41.75	34.90	11.32	40.23	47.74	74.00	-26.26	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	33.58	34.90	11.32	40.23	39.57	54.00	-14.43	Horizontal
5460.00	32.24	34.90	11.32	40.23	38.23	54.00	-15.77	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT20

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.52	35.37	11.19	40.18	48.90	74.00	-25.10	Horizontal
5350.00	42.03	35.37	11.19	40.18	48.41	74.00	-25.59	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.68	35.37	11.19	40.18	39.06	54.00	-14.94	Horizontal
5350.00	31.33	35.37	11.19	40.18	37.71	54.00	-16.29	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	43.01	34.90	11.32	40.23	49.00	74.00	-25.00	Horizontal
5460.00	42.28	34.90	11.32	40.23	48.27	74.00	-25.73	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	32.25	34.90	11.32	40.23	38.24	54.00	-15.76	Horizontal
5460.00	32.14	34.90	11.32	40.23	38.13	54.00	-15.87	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.15	35.37	11.19	40.18	48.53	74.00	-25.47	Horizontal
5350.00	42.28	35.37	11.19	40.18	48.66	74.00	-25.34	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.71	35.37	11.19	40.18	39.09	54.00	-14.91	Horizontal
5350.00	32.03	35.37	11.19	40.18	38.41	54.00	-15.59	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	42.25	34.90	11.32	40.23	48.24	74.00	-25.76	Horizontal
5460.00	42.07	34.90	11.32	40.23	48.06	74.00	-25.94	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	32.36	34.90	11.32	40.23	38.35	54.00	-15.65	Horizontal
5460.00	31.18	34.90	11.32	40.23	37.17	54.00	-16.83	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11ac-HT80

Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	41.71	35.37	11.19	40.18	48.09	74.00	-25.91	Horizontal
5350.00	42.05	35.37	11.19	40.18	48.43	74.00	-25.57	Vertical
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.56	35.37	11.19	40.18	38.94	54.00	-15.06	Horizontal
5350.00	31.12	35.37	11.19	40.18	37.50	54.00	-16.50	Vertical
Test channel		Middle			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	41.76	34.90	11.32	40.23	47.75	74.00	-26.25	Horizontal
5460.00	41.18	34.90	11.32	40.23	47.17	74.00	-26.83	Vertical
Test channel		Middle			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	32.22	34.90	11.32	40.23	38.21	54.00	-15.79	Horizontal
5460.00	31.37	34.90	11.32	40.23	37.36	54.00	-16.64	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.7.2 Unwanted Emissions out of the Restricted Bands

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10:2013
TestFrequencyRange:	30MHz to 40GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	RMS	1MHz	3MHz	Average Value

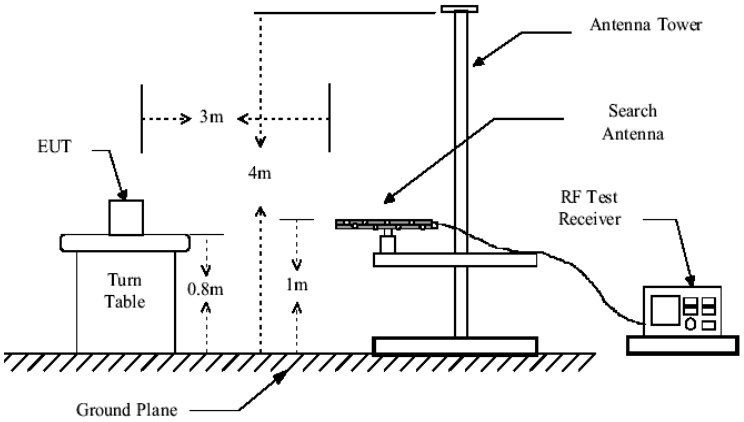
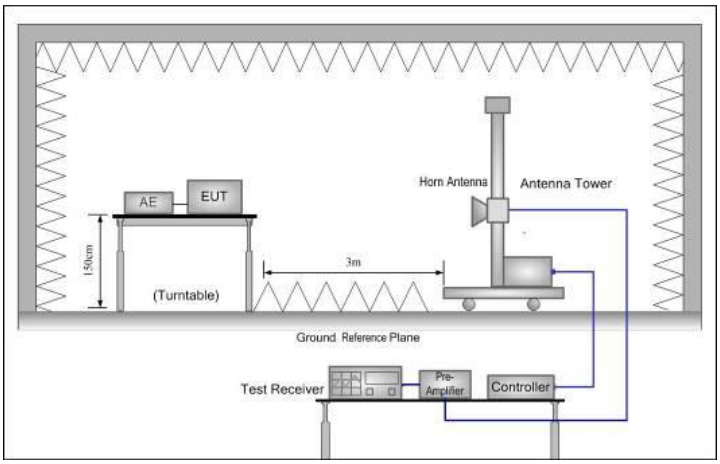
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	68.20	Peak Value
	54.00	Average Value

Remark:
Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m,for EIPR[dBm]=-27dBm.

Test Procedure:

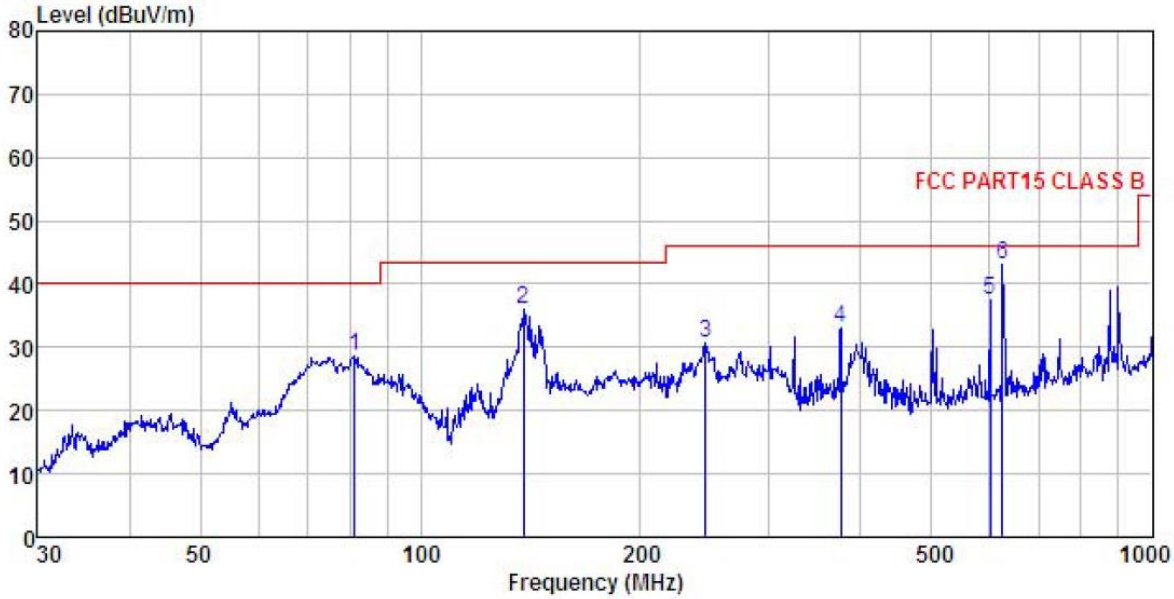
1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Below 1GHz

Adapter① test mode

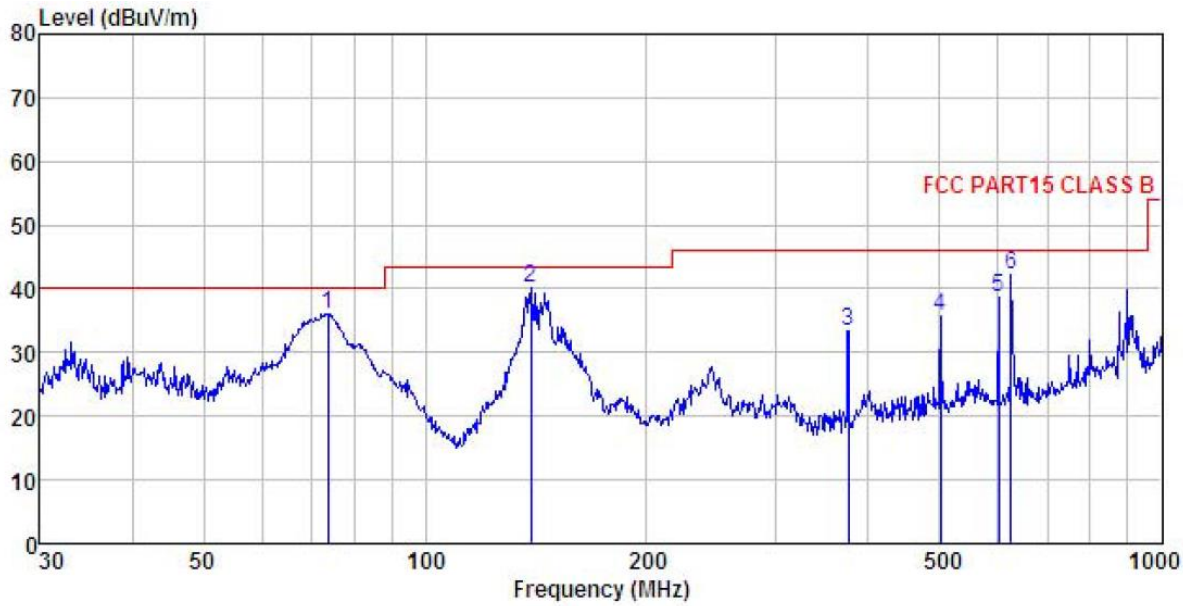
Horizontal:




```
Site          : 3m chamber
Condition     : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL
Pro           :
EUT           : Broadband Digital Transmission System
Model         : NFT 3ac
Test mode     : 5G-Wifi TX mode
Power Rating  : AC120V/60Hz
Environment   : Temp:25.5℃  Huni:55%
Test Engineer: MT
Remark        : 3dBi  ant(adapter:GRT-POE20-480050A)
```

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	81.212	49.83	6.73	1.69	29.63	28.62	40.00	-11.38	QP
2	138.387	51.09	11.81	2.38	29.28	36.00	43.50	-7.50	QP
3	245.090	44.66	11.85	2.82	28.57	30.76	46.00	-15.24	QP
4	375.939	43.62	15.09	3.09	28.68	33.12	46.00	-12.88	QP
5	601.427	43.93	18.50	3.94	28.93	37.44	46.00	-8.56	QP
6	625.078	49.34	18.64	3.90	28.86	43.02	46.00	-2.98	QP

Vertical:

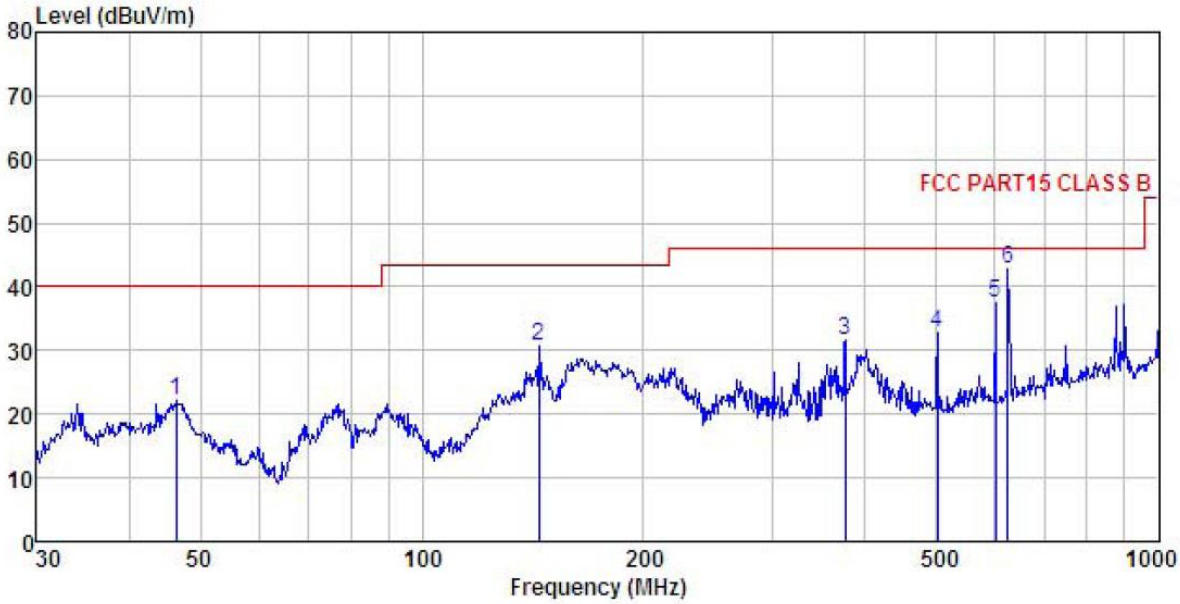


Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL
Pro :
EUT : Broadband Digital Transmission System
Model : NFT 3ac
Test mode : 5G-Wifi TX mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: MT
Remark : 3dBi ant(adapter:GRT-POE20-480050A)

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	73.876	57.84	6.40	1.61	29.69	36.16	40.00	-3.84	QP
2	139.361	55.42	11.74	2.39	29.28	40.27	43.50	-3.23	QP
3	375.939	44.00	15.09	3.09	28.68	33.50	46.00	-12.50	QP
4	501.179	44.19	16.80	3.63	28.96	35.66	46.00	-10.34	QP
5	601.427	45.14	18.50	3.94	28.93	38.65	46.00	-7.35	QP
6	625.078	48.63	18.64	3.90	28.86	42.31	46.00	-3.69	QP

Adapter② test mode

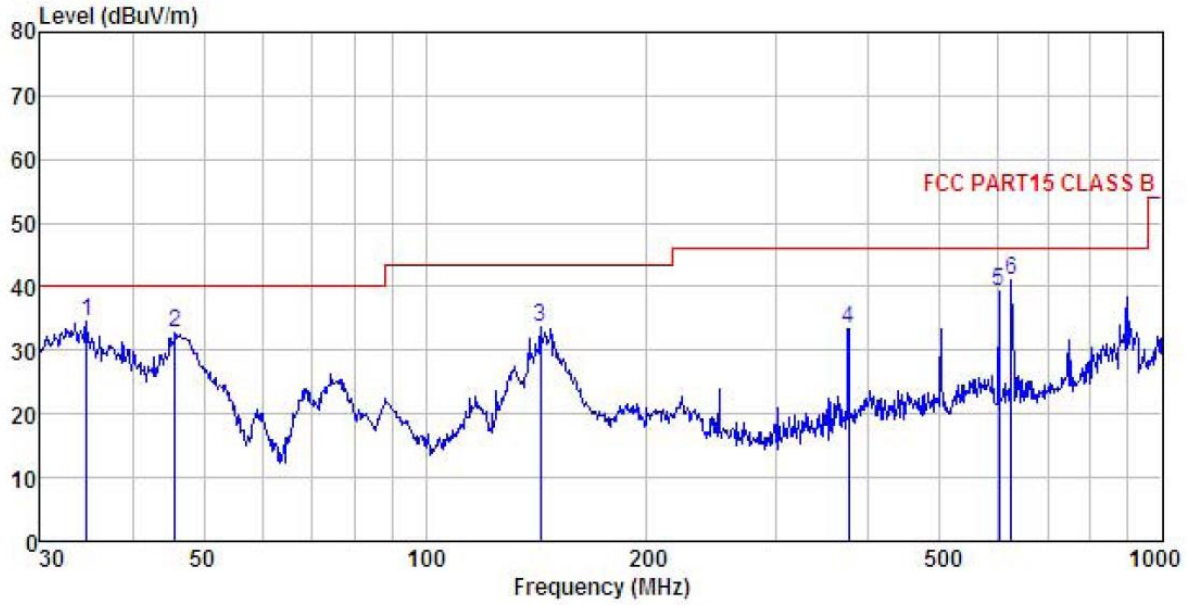
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL
Pro :
EUT : Broadband Digital Transmission System
Model : NFT 3ac
Test mode : 5G-Wifi TX mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: MT
Remark : 3dBi ant (adapter :G0720-480-050)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	46.340	33.49	17.08	1.28	29.85	22.00	40.00	-18.00	QP
2	144.335	46.29	11.27	2.45	29.25	30.76	43.50	-12.74	QP
3	375.939	41.95	15.09	3.09	28.68	31.45	46.00	-14.55	QP
4	501.179	41.37	16.80	3.63	28.96	32.84	46.00	-13.16	QP
5	601.427	43.93	18.50	3.94	28.93	37.44	46.00	-8.56	QP
6	625.078	49.10	18.64	3.90	28.86	42.78	46.00	-3.22	QP

Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL
Pro :
EUT : Broadband Digital Transmission System
Model : NFT 3ac
Test mode : 5G-Wifi TX mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: MT
Remark : 3dBi ant (adapter :G0720-480-050)

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	34.639	49.03	14.54	1.04	29.95	34.66	40.00	-5.34	QP
2	45.695	44.14	17.28	1.29	29.85	32.86	40.00	-7.14	QP
3	143.326	49.23	11.34	2.44	29.25	33.76	43.50	-9.74	QP
4	375.939	43.91	15.09	3.09	28.68	33.41	46.00	-12.59	QP
5	601.427	45.84	18.50	3.94	28.93	39.35	46.00	-6.65	QP
6	625.078	47.28	18.64	3.90	28.86	40.96	46.00	-5.04	QP

Above 1GHz:

Band 1:

802.11a mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	41.63	40.10	15.37	41.34	55.76	68.20	-12.44	Vertical
10360.00	42.27	40.10	15.37	41.34	56.40	68.20	-11.80	Horizontal
802.11a mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	31.58	40.10	15.37	41.34	45.71	54.00	-8.29	Vertical
10360.00	32.15	40.10	15.37	41.34	46.28	54.00	-7.72	Horizontal

802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	41.25	40.00	15.42	41.27	55.40	68.20	-12.80	Vertical
10400.00	41.02	40.00	15.42	41.27	55.17	68.20	-13.03	Horizontal
802.11a mode Middle channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.06	40.00	15.42	41.27	46.21	54.00	-7.79	Vertical
10400.00	31.44	40.00	15.42	41.27	45.59	54.00	-8.41	Horizontal

802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	40.45	39.70	15.55	41.10	54.60	68.20	-13.60	Vertical
10480.00	40.23	39.70	15.55	41.10	54.38	68.20	-13.82	Horizontal
802.11a mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	30.12	39.70	15.55	41.10	44.27	54.00	-9.73	Vertical
10480.00	30.76	39.70	15.55	41.10	44.91	54.00	-9.09	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are 20dB lower than the limit and not show in test report.*

802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	42.03	40.10	15.37	41.34	56.16	68.20	-12.04	Vertical
10360.00	40.69	40.10	15.37	41.34	54.82	68.20	-13.38	Horizontal
802.11n20 mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	32.25	40.10	15.37	41.34	46.38	54.00	-7.62	Vertical
10360.00	31.13	40.10	15.37	41.34	45.26	54.00	-8.74	Horizontal

802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	42.67	40.00	15.42	41.27	56.82	68.20	-11.38	Vertical
10400.00	41.25	40.00	15.42	41.27	55.40	68.20	-12.80	Horizontal
802.11n20 mode Middle channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.41	40.00	15.42	41.27	46.56	54.00	-7.44	Vertical
10400.00	30.12	40.00	15.42	41.27	44.27	54.00	-9.73	Horizontal

802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	42.05	39.70	15.55	41.10	56.20	68.20	-12.00	Vertical
10480.00	42.36	39.70	15.55	41.10	56.51	68.20	-11.69	Horizontal
802.11n20 mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	32.03	39.70	15.55	41.10	46.18	54.00	-7.82	Vertical
10480.00	32.47	39.70	15.55	41.10	46.62	54.00	-7.38	Horizontal

Remark:

3. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
4. *The emission levels of other frequencies are 20dB lower than the limit and not show in test report.*

802.11n40 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	41.05	40.00	15.42	41.31	55.16	68.20	-13.04	Vertical
10380.00	40.63	40.00	15.42	41.31	54.74	68.20	-13.46	Horizontal
802.11n40 mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	31.48	40.00	15.42	41.31	45.59	54.00	-8.41	Vertical
10380.00	30.29	40.00	15.42	41.31	44.40	54.00	-9.60	Horizontal

802.11n40 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	40.25	39.80	15.51	41.17	54.39	68.20	-13.81	Vertical
10460.00	41.48	39.80	15.51	41.17	55.62	68.20	-12.58	Horizontal
802.11n40 mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	31.12	39.80	15.51	41.17	45.26	54.00	-8.74	Vertical
10460.00	31.65	39.80	15.51	41.17	45.79	54.00	-8.21	Horizontal

802.11ac-HT80MHz mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.00	42.13	39.90	15.46	41.24	56.25	68.20	-11.95	Vertical
10420.00	42.01	39.90	15.46	41.24	56.13	68.20	-12.07	Horizontal
802.11ac-HT80MHz mode Middle channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.00	32.58	39.90	15.46	41.24	46.70	54.00	-7.30	Vertical
10420.00	30.12	39.90	15.46	41.24	44.24	54.00	-9.76	Horizontal

Remark:

5. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
6. *The emission levels of other frequencies are 20dB lower than the limit and not show in test report.*

Band 4:

802.11a mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	42.03	41.50	16.83	40.75	59.61	74.00	-14.39	Vertical
11490.00	41.96	41.50	16.83	40.75	59.54	74.00	-14.46	Horizontal
802.11a mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	32.03	41.50	16.83	40.75	49.61	54.00	-4.39	Vertical
11490.00	32.71	41.50	16.83	40.75	50.29	54.00	-3.71	Horizontal

802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	40.56	41.38	16.90	40.91	57.93	74.00	-16.07	Vertical
11570.00	40.39	41.38	16.90	40.91	57.76	74.00	-16.24	Horizontal
802.11a mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	31.62	41.38	16.90	40.91	48.99	54.00	-5.01	Vertical
11570.00	31.53	41.38	16.90	40.91	48.90	54.00	-5.10	Horizontal

802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	40.96	41.26	16.97	41.06	58.13	74.00	-15.87	Vertical
11650.00	40.25	41.26	16.97	41.06	57.42	74.00	-16.58	Horizontal
802.11a mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	32.02	41.26	16.97	41.06	49.19	54.00	-4.81	Vertical
11650.00	31.14	41.26	16.97	41.06	48.31	54.00	-5.69	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are 20dB lower than the limit and not show in test report.*

802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	41.25	41.50	16.83	40.75	58.83	74.00	-15.17	Vertical
11490.00	40.16	41.50	16.83	40.75	57.74	74.00	-16.26	Horizontal
802.11n20 mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	31.52	41.50	16.83	40.75	49.10	54.00	-4.90	Vertical
11490.00	31.36	41.50	16.83	40.75	48.94	54.00	-5.06	Horizontal

802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	41.36	41.38	16.90	40.91	58.73	74.00	-15.27	Vertical
11570.00	42.05	41.38	16.90	40.91	59.42	74.00	-14.58	Horizontal
802.11n20 mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	31.56	41.38	16.90	40.91	48.93	54.00	-5.07	Vertical
11570.00	31.27	41.38	16.90	40.91	48.64	54.00	-5.36	Horizontal

802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	41.25	41.26	16.97	41.06	58.42	74.00	-15.58	Vertical
11650.00	41.75	41.26	16.97	41.06	58.92	74.00	-15.08	Horizontal
802.11n20 mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	31.25	41.26	16.97	41.06	48.42	54.00	-5.58	Vertical
11650.00	30.53	41.26	16.97	41.06	47.70	54.00	-6.30	Horizontal

Remark:
1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are 20dB lower than the limit and not show in test report.*

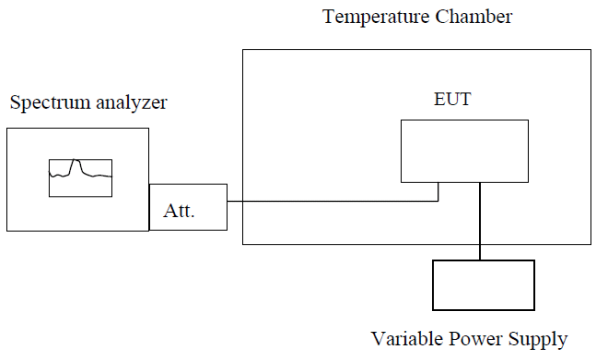
802.11n40 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	41.25	41.50	16.83	40.77	58.81	74.00	-15.19	Vertical
11510.00	40.23	41.50	16.83	40.77	57.79	74.00	-16.21	Horizontal
802.11n40 mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	31.23	41.50	16.83	40.77	48.79	54.00	-5.21	Vertical
11510.00	31.26	41.50	16.83	40.77	48.82	54.00	-5.18	Horizontal

802.11n40 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	42.03	41.32	16.93	40.95	59.33	74.00	-14.67	Vertical
11590.00	41.11	41.32	16.93	40.95	58.41	74.00	-15.59	Horizontal
802.11n40 mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	32.03	41.32	16.93	40.95	49.33	54.00	-4.67	Vertical
11590.00	31.25	41.32	16.93	40.95	48.55	54.00	-5.45	Horizontal

802.11ac-HT80 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.00	42.17	41.44	16.86	40.88	59.59	74.00	-14.41	Vertical
11550.00	41.25	41.44	16.86	40.88	58.67	74.00	-15.33	Horizontal
802.11ac-HT80 mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.00	31.62	41.44	16.86	40.88	49.04	54.00	-4.96	Vertical
11550.00	31.53	41.44	16.86	40.88	48.95	54.00	-5.05	Horizontal

Remark:
3. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
4. *The emission levels of other frequencies are 20dB lower than the limit and not show in test report.*

6.8 Frequency stability

Test Requirement:	FCC Part15 E Section 15.407 (g)
Limit:	Manufacturers of U-NII devices are responsible for ensuringfrequency stability such that anemission is maintained within the band of operation under all conditions of normal operation asspecified in the user's manual.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage ofEUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage.Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.
Test results:	Passed

Measurement Data (the worst channel):

Band 1:

Voltage vs. Frequency Stability (Lowest channel=5180MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(ac)		
20	102V	5179.997592	0.46
	120V	5179.974639	4.90
	138V	5179.963749	7.00

Temperature vs. Frequency Stability (Lowest channel=5180MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(ac)	Temp(℃)		
120V	-20	5179.987362	2.44
	-10	5179.995964	0.78
	0	5179.968527	6.08
	10	5179.987639	2.39
	20	5179.996487	0.68
	30	5179.974529	4.92
	40	5179.963662	7.02
	50	5179.974417	4.94

Band 4:

Voltage vs. Frequency Stability (Lowest channel=5745MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(ac)		
20	102V	5744.974854	4.38
	120V	5744.993526	1.13
	138V	5744.998632	0.24

Temperature vs. Frequency Stability (Lowest channel=5745MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(ac)	Temp(℃)		
120V	-20	5744.994748	0.91
	-10	5744.993692	1.10
	0	5744.994885	0.89
	10	5744.985478	2.53
	20	5744.993692	1.10
	30	5744.994495	0.96
	40	5744.999487	0.09
	50	5744.992590	1.29